

SOUTHERN POWER AND INDUSTRY

APRIL, 1956

SPI's 52nd Year

FACTS & TRENDS

Incineration . . . power modernization . . . atomic conferences . . . how to buy coal . . . testing cooling towers . . . no re-inking . . . magnetic conveyors . . . gas turbines

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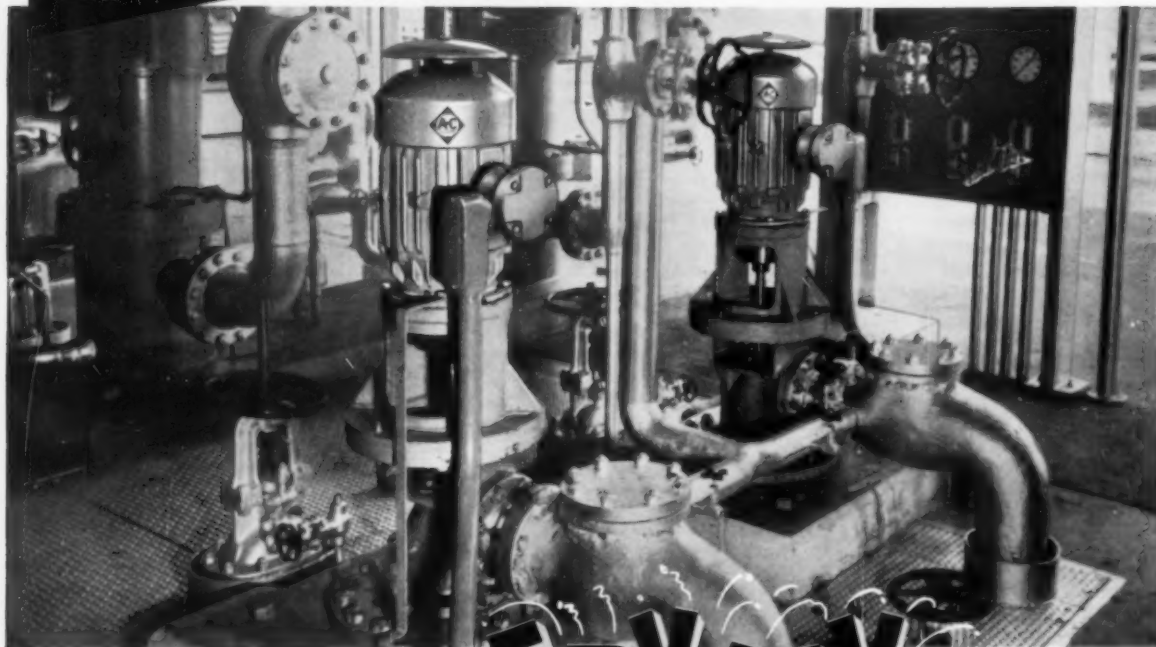
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Defeat corrosion at its source

There's
MORE

Cooling Surface in these deep-ribbed **MOTORS**



No Day is

FRY DAY



with these **Allis-Chalmers**

MOTORS

● Frying of insulation is impossible under normal conditions with the extra-large cooling surface of Allis-Chalmers rib-type TEFC motors. The result — you expect and get longer motor life.

The engineered partner of A-C motors is Allis-Chalmers control.

Get Complete Information

As a new machinery component or as replacement, specify Allis-Chalmers. Discuss your particular application with your nearby A-C distributor, A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



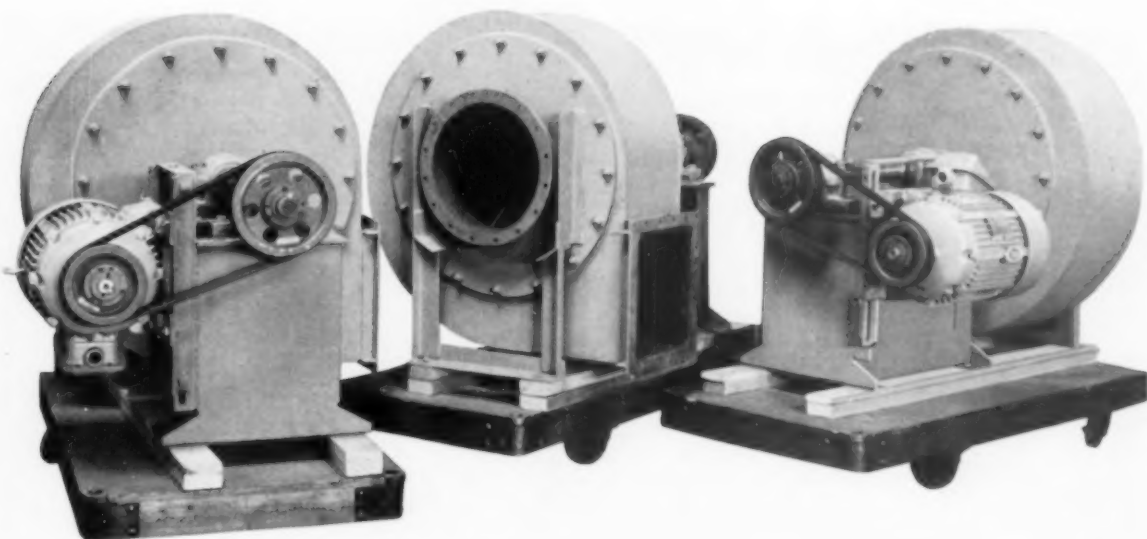
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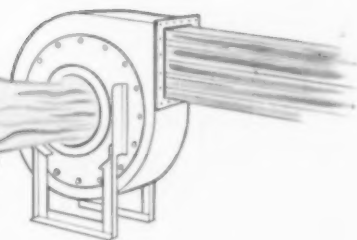
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Volume 74

Number 4



EXHAUSTING CORROSIVE FUMES



no problem for Clarage rubber-lined fans

Clarage's distinctively heavy-duty construction, plus the added advantage of special coatings, add up to far longer service life. Important savings for you!

The Clarage fans above are now serving as leach tank exhausters, handling fumes from a concentrated brine solution containing up to 5% hydrochloric acid. In this case, all interior fan parts are protected by a layer of rubber vulcanized to the metal. For other extra-severe applications Clarage fans can be treated with other special coatings, lead lined, or built of special construction.

If you're seeking fans that have what it takes — in every respect — call us in. CLARAGE FAN CO., Kalamazoo, Michigan.



Send for Bulletin 702-A

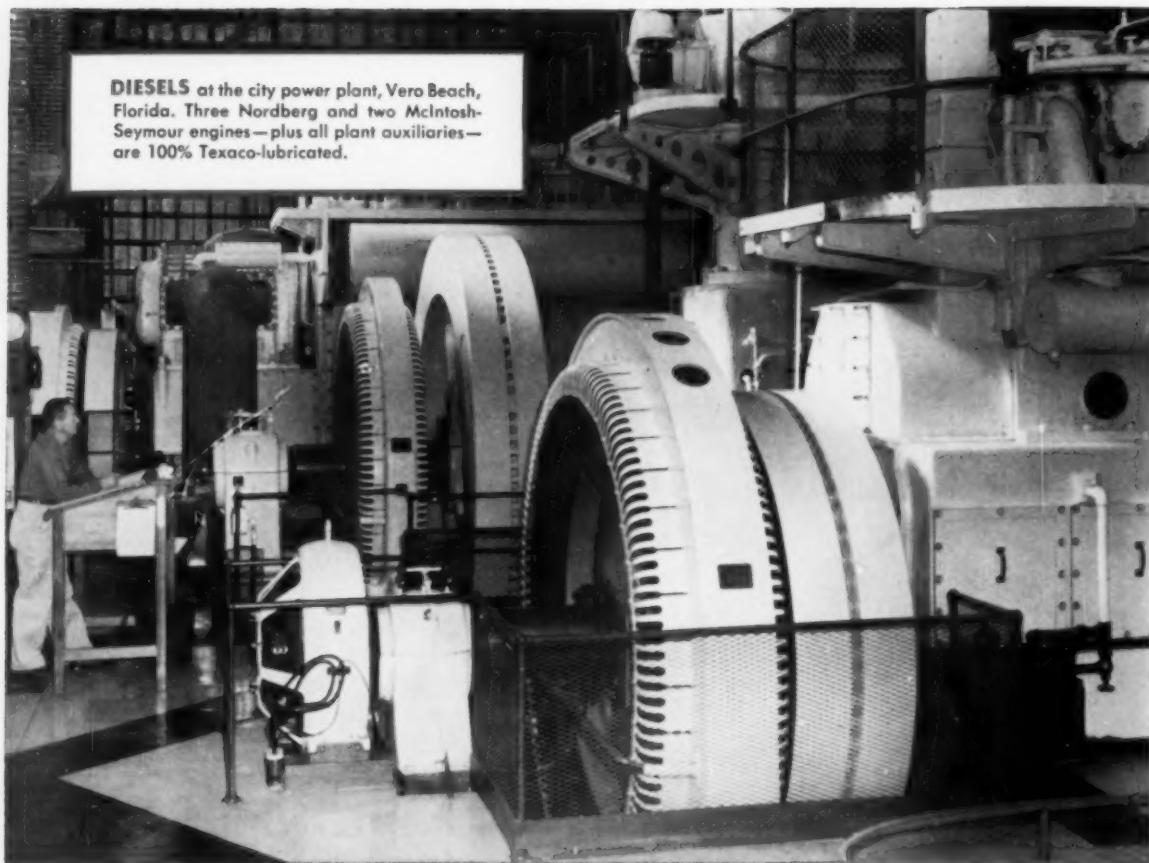
CLARAGE

... dependable equipment for
making air your servant

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

SOUTHERN POWER & INDUSTRY for APRIL, 1956

DIESELS at the city power plant, Vero Beach, Florida. Three Nordberg and two McIntosh-Seymour engines—plus all plant auxiliaries—are 100% Texaco-lubricated.



Comparison Proves TEXACO Best for diesels at Vero Beach, Florida, power plant

The entire power plant at Vero Beach, Florida—including five diesels totaling over 12,000 h.p.—has been 100% Texaco-lubricated for the past two years. This confidence in Texaco began when *Texaco Ursa Oil* was tested against a leading competitive brand. Says Superintendent of Power Plant Fred Gossett:

"*Texaco Ursa Oil* definitely showed a superior ability to keep our diesels clean and free from deposits, prevent stuck rings and valves, reduce wear. We decided on *Texaco Ursa Oil* for all our diesels, and have been more than satisfied with the results—higher engine efficiency, lower fuel and maintenance costs."

Operators everywhere enjoy similar benefits. In fact—

For over 20 years, more stationary diesel h.p. in the U.S. has been lubricated with Texaco than with any other brand.

The complete line of *Texaco Ursa Oils* is especially refined and processed to assure *more power* with *less fuel* over *longer periods* between overhauls—for all diesels, gas and dual-fuel engines.

A Texaco Lubrication Engineer will gladly help you select the one best suited to *your* engines. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO URSA OILS

FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

SOUTHERN POWER AND INDUSTRY

Vol. 74
No. 4

APRIL, 1956



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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

April, 1956

- ◆ **INCINERATION OF INDUSTRIAL WASTE**—Industries in urban localities are faced with disposing of waste economically, and at the same time avoiding air pollution. In this issue, John C. Marks, Chief Engineer, Louisville Medical Center Power Plant, offers certain guides and recommended procedures—and then gives details of a specific problem and solution.

This report can form the basis for studies in other individual plants. Data on combustion characteristics of various waste products are presented. Test reports and tabulations show what performance may reasonably be expected—and how to go about improving operation.

- ◆ **POWER SERVICE MODERNIZATION** at Carbide & Carbon's Charleston, West Virginia, plant is saving \$470,000 per year. An outmoded installation was replaced with a modern 289,000 lb/hr pulverized-coal fired boiler and power distribution was revamped.

Investment is paying off in a hurry—increased efficiency, \$175,000; fuel savings and lower maintenance costs, \$85,000; no flyash disposal problem, \$10,000; less manpower, \$50,000; and lower power generation costs, \$150,000.

- ◆ **ATOMIC ENERGY CONFERENCES**—Engineers are finding ways and means to put atomic energy to practical use in industrial and power plants. Enormous progress has been made. The atom has gone to work and every industry will feel the impact.

A conference on "Prospects for Atomic Energy in the South" is scheduled for the Atlanta Biltmore Hotel, April 17th and 18th, and in Oak Ridge, Tennessee on April 19th.

A two day conference "Atoms in Business" will be held at the Plaza Hotel, San Antonio, Texas, on May 10th and 11th. Meeting is sponsored jointly by Southwest Research Institute and the Atomic Industrial Forum, Inc.

- ◆ **BUYING OR USING COAL?** There is a lot more to buying coal than the cost per ton. It might be high in ash. So you are buying ashes at the coal price, paying freight on them from the mine, then paying to have them hauled away. Your "cheaper" coal clinkers; it smokes, it fouls the tubes. That means higher labor costs and higher maintenance. You can often pay more per ton and save thousands of dollars a year.

Why not take advantage of the free coal counseling now being offered by The Chesapeake and Ohio Railway and Norfolk and Western Railway? Their coal bureau engineers will advise on the selection, transportation and utilization of the right coal for your purpose.

- ◆ **TEST YOUR COOLING TOWER**—Know your tower's capabilities and limitations. The Marley Company's technical bulletin "Test Your Tower" offers a simple, proven method by which you can determine how closely your actual tower performance measures up to specified

(Continued on Page 6)

A Modern AUTOTRANSFORMER STARTER

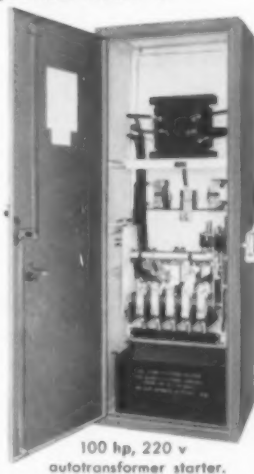
with Air Break Contacts up to 75 HP, 220 V; 150 HP, 440-550 V



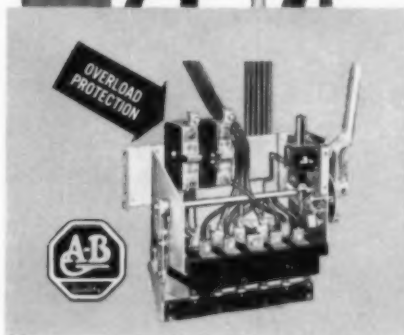
Think of it! Air break, silver alloy contacts . . . no messy oil to bother with. The contacts stay in good condition without filing, cleaning, or dressing. This air break feature, alone, makes this Bulletin 646 starter the most up-to-date, manually operated, autotransformer starter on the market.

Air break contacts are standard for Sizes A, B, and C starters, but these starters can be furnished with oil-immersed contacts, where operating conditions require them. Only the Size D starter, rated up to 250 hp, uses oil immersed contacts. Write for Bulletin 646.

Allen-Bradley Co.
1328 S. Second St., Milwaukee 4, Wis.
In Canada—
Allen-Bradley Canada Ltd., Galt, Ont.



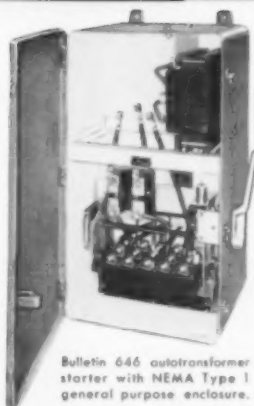
100 hp, 220 v
autotransformer starter.



OVERLOAD PROTECTION—The Bulletin 646 autotransformer starter has two Bulletin B16 automatic reset thermal overload relays that assure dependable overload protection.

NO-VOLTAGE RELEASE—The starter contacts are held in the RUN position by a solenoid latch, which drops out if the line voltage fails and opens the starter contacts. The motor cannot restart, when line voltage is restored, unless the starter is operated through the starting cycle.

TIME DELAY DASH POT—The ad-



Bulletin 646 autotransformer
starter with NEMA Type 1
general purpose enclosure.

justable dash pot can be set for 0 to 15 seconds.

SIGNAL BELL—A bell indicates when the starting lever is to be pushed into the RUN position. This feature removes the starting interval of the motor from the operator's judgment. Correct starting for existing line and motor conditions is the result.

AUTOTRANSFORMER—The open Delta-connected 3-phase autotransformer has 50%, 65%, and 80% reduced voltage taps. The starting voltage, therefore, can be easily adjusted to suit the load.

ALLEN-BRADLEY SOLENOID MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

ALBUQUERQUE—A & A Supply Co., 114 Morningside Dr., N. E., Tel: 5-5506
ATLANTA—W. R. Colverley, 1000 Peachtree St., N. E., P. O. Box 7086, Sta. C., Tel: Elgin 8833
BALTIMORE—H. M. Wood & Co., 124 Light St., Tel: MULberry 5-4643-4
BIRMINGHAM—J. L. Howarth Co., Inc., 3021 Seventh Ave., So., Tel: 53-1171
CHARLESTON—Henry E. Payne, 310 Union Bldg., Tel: 3-1393
CHARLOTTE—Le Roy P. Spoon, 307 Lincoln St., Tel: EDison 4-6334
DALLAS—J. K. Webb, 2810 McKinney Ave., Tel: Tenison 6179
HOUSTON—Wilson Electrical Equip. Co., 2930 Commerce Ave., Tel: Capital 8-1557
JACKSONVILLE—Robert P. Smith & Co., 2031 Hendricks Ave., Tel: 9-9474
KANSAS CITY—B. L. McCreary & Son, 1819 Central St., Tel: Harrison 1-1668
KNOXVILLE—Bowditch & Co., 1311-C N. Broadway, P. O. Box 3143, Tel: 4-2513

LITTLE ROCK—Curtis H. Stout, Inc., P. O. Box 107, 400 Shaft St., Franklin 4-8201
LOUISVILLE—Rietze & Co., 2209 S. Floyd St., Tel: MEtrose 7-3603
MEMPHIS—Curtis H. Stout of Tennessee, Inc., 718 M & M Bldg., Tel: JACson 6-7601
MIAMI—Leo-Smith Co., 121 S. E. First St., Tel: 82-6766
NEW ORLEANS—Robbins & Robbins, 1037 Magazine St., Tel: Canal 5805
PHOENIX—E. P. Weller & Co., 1902 East Rovey Ave., Tel: AMhurst 6-3188
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SAN DIEGO—James A. Setchell Co., Inc., 301 W. "G" St., Tel: BELmont 3-3981
TULSA—John W. Elder Co., 1526 East Fourth St., Tel: DIamond 3-9149

Facts and trends (continued from page 4)

performance. Such information is well worth knowing, particularly in those industries where the whole tempo of operations is closely geared to temperature of process cooling water. Circle No. 705 on SPI's Reader Service Post Card—page 17—for your free copy.

- ◆ SPI's 10th ANNUAL PLANT MAINTENANCE ISSUE will be in your office on May 1 presenting "plant-tested" procedures to reduce maintenance costs, save materials and improve operations.

You and other engineers in manufacturing, power and large service plants throughout the South and Southwest set the pattern of this issue, reporting on proven maintenance procedures.

Few of you will find it profitable to study every article—but if you will spin the pages, and read the titles and subtitles, you are sure to find one, two—or a dozen ideas that will help you improve maintenance in your own plant.

- ◆ NUCLEAR POWER IS NOW "BIG BUSINESS"—Investor-owned power companies have planned atomic power plants requiring a capital investment of \$225 million. Over 60,000 are engaged in construction and 75,000 in the operation of nuclear projects. Only about 6,000 are working directly for the Atomic Energy Commission, making a grand total in excess of 140,000.

- ◆ TROUBLE FREE RECORDING—Got a messy, time-consuming job of re-inking pens on your recorders? Bailey Meter is now using a new hermetically sealed, non-evaporating, non-corrosive inking system on their recorders. Transparent plastic ink sacs are changed once a year. Capillary tubing carries fresh, clean ink to pens continuously without day-to-day attention. Circle No. 293 on SPI's Reader Service Post Card—page 17—for details.

- ◆ FLORIDA NUCLEAR POWER PLANT with a possible 1962-63 operating date is being planned by Florida Power and Light Co., Tampa Electric Co. and Florida Power Corp. The three utilities are working with B & W and Allis-Chalmers.

- ◆ CONVERSION OF ORDINARY BELT CONVEYORS to magnetic conveyor-elevators is possible with Eriez Manufacturing Company's Magna-Rails—a specially designed circuit of Alnico magnetic castings. Needed lengths are placed under the conveyor belt permitting movement of nails, cans, metal parts, scrap, etc., up inclines as steep as 75 to 80 degrees.

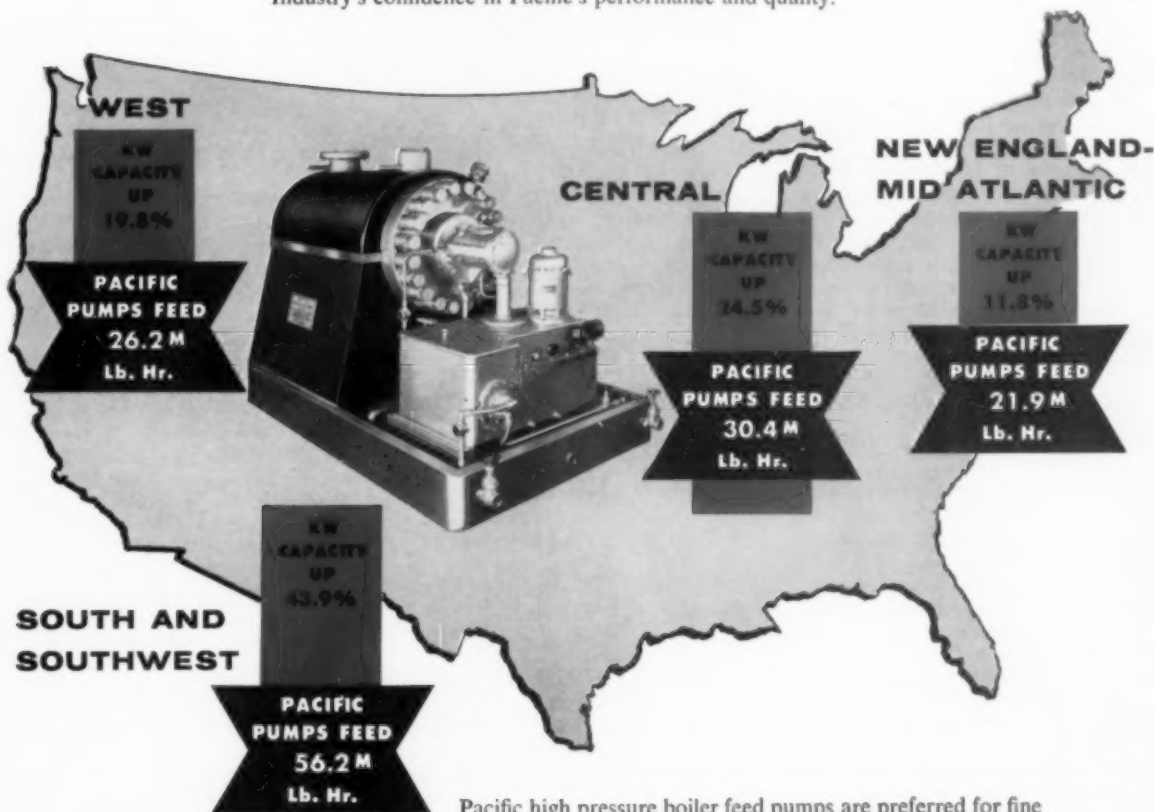
- ◆ GAS TURBINES have become an increasingly effective way to produce power in a variety of applications. General Electric recently announced that 100 of their gas turbines have accumulated over 1,000,000 hours of operation.

Operating advantages include few wearing parts, small water requirements, ability to operate automatically in remote areas, and ability to burn a variety of fuels—natural gas, diesel oil, distillate and specification Bunker C.

They are being applied in end-of-line applications and for peaking on large electric utility systems. The gas turbine fits in small base-load plants as well as in larger power stations where it can improve economy of the steam turbine cycle. They also provide power for natural gas pipeline pumping where they contribute to lower pumping costs and in the petrochemical industry where continuous 24-hour, 7-day a week compressor service is required.

Keeping up with the kilowatts

From 1951 to 1955 the capacity of Pacific high pressure boiler feed pumps installed in each of the four regional areas of the U. S. has kept pace with the increase in electrical generating capacity in each area. This universal acceptance and repeat orders from individual Utilities in each area for 12-15 units express the Industry's confidence in Pacific's performance and quality.



Pacific high pressure boiler feed pumps are preferred for fine new power plants everywhere. They follow the load perfectly from 100% down to trip off. They are efficient—economical to operate and maintain.



PACIFIC PUMPS INC.

HUNTINGTON PARK, CALIFORNIA

Offices in All Principal cities

Export Office: Chanin Bldg., 122 E. 42nd St., New York

PACIFIC®

NEWS for the South and Southwest

L. B. Foster Co. Expands Atlanta Office Staff

Two sales representatives, William A. Stovall and Herbert E. Waterhouse, have been added to the Atlanta office of L. B. Foster Company, nation-wide distributor of foundation pipe piling, structural grade pipe, steel sheet piling and rail and track accessories.

Mr. Stovall will specialize in buying and selling steel pipe. For the last nine years he was a sales correspondent with the Atlanta office of National Tube Division, United States Steel Corporation.

Mr. Waterhouse was previously with Atlantic Steel Company's warehouse division as both a city and territory sales representative.



Herbert Waterhouse and William Stovall

Foster's Atlanta, Georgia, office is under the direction of Paul A. Duke, regional manager. A six-acre warehousing area for fabrication and storage of steel sheet piling, pipe and railroad trackage was recently opened in Atlanta to provide faster service for Southeastern customers.

Atomic Energy Conference — Atlanta, Ga., April 17th & 18th; Oak Ridge, April 19th

Engineers are finding ways and means to put atomic energy to practical use in industry, the power field, propulsion of ships and aircraft, medicine, and in agriculture. Enormous progress has been made. The atom has gone to work, or will soon be at work, and probably every industry will feel the impact.

The country's top atomic engineers, business executives and government officials will meet in a conference on the "Prospects for Atomic Energy in the South"—scheduled for the Atlanta Biltmore Hotel, April 17th and 18th, and in Oak Ridge, Tennessee on April 19th.

Meeting is sponsored by the Atomic Industrial Forum, The First National Bank of Atlanta, Oak Ridge Institute of Nuclear Studies, Oak Ridge National Laboratory, Southern Association of Science & Industry, and the Southern Research Institute. Conference headquarters are The First National Bank of Atlanta, Box 4148, Atlanta 2, Georgia.

Some of the more important subjects to be covered in the discussions are:

1. Technical developments and current status of atomic energy.
2. The importance of atomic energy

and atomic by-products for the South.

3. Progress towards atomic power in the South.

4. Licensing, patents and other legal problems in atomic energy and in the use of atomic by-products.

5. State regulations.

6. Management functions and problems in atomic energy.

7. The industrial development of atomic energy in the South.

8. Information sources on atomic energy.

9. The significance of atomic energy to the chemical industry.

10. How a manufacturing company gets into atomic energy—a case study.

11. Application of radioisotopes in industry, agriculture and medicine.

On the third day of the conference industrialists will visit the graphite and swimming pool reactors in Oak Ridge and witness the packaging of radioisotopes, tour the large plant areas where uranium 235 is separated, and hear the work of the huge atomic energy facility explained by Oak Ridge officials.

More News — Page 102

Southeastern Changes for National Electric Products

John R. Patton has been named Atlanta District Sales Manager for National Electric Products Corporation.

Mr. Patton joined National Electric in 1947 and served the sales office at Charlotte, North Carolina. Prior to his promotion to Atlanta District Manager, he was in charge of marketing the company's electrical materials throughout the state of Florida.

Mr. Patton's office is located in the company's Southeastern Headquarters at 1500 South Fernwood Circle, North Atlanta, Georgia. His new position places him in National's Southeast Sales Region, managed by W. J. Barnes.

Frank Brady, former Atlanta district sales manager was recently named New York City district manager. A 1934 graduate of Georgia Tech, Mr. Brady also attended The Citadel at Charleston, South Carolina.

Frederick K. Bullard has been appointed district sales manager of the Florida Sales District with headquarters at 501 W. Lafayette St., Tampa 2, Florida. His new position also places him in National's Southeast Sales Region, managed by W. J. Barnes.

Pyle-National's New Southeastern Repr.

Applied Engineering Company and D. B. Gooch Associates have recently been appointed manufacturers representatives for the Pyle-National Company's line of Turbo-Generators and mechanical drive steam turbines.

Applied Engineering Company has offices at Box 506, Orangeburg, South Carolina; 500 Piedmont St., N.E., Atlanta, Georgia; and Box 2311, Greensboro, North Carolina.

D. B. Gooch Associates, have headquarters at 5018 First Ave., N., Birmingham, Alabama, and a Florida sales office—Johnson Runey II & Associates, Box 26, 1136 Drew St., Clearwater, Florida.

Now — A Revolutionary NEW Steam Trap!

**INSTALL
IT—**



**FORGET
IT!**



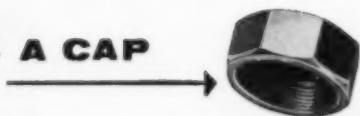
SO RUGGED

SO SIMPLE

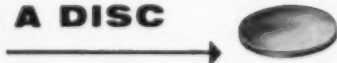
this steam trap practically eliminates maintenance

Major advance in trap design!

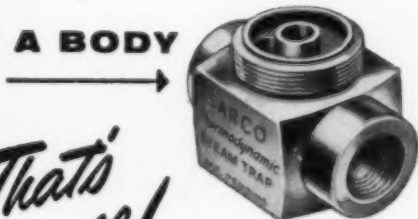
1. A CAP



2. A DISC



3. A BODY



*That's
all!*

Imagine a steam trap machined from a solid block of stainless steel. A trap with only 3 parts...cap, disc and body...and not even a valve-closing mechanism—the kinetic energy of steam closes the valve and **ONLY** the TD uses this new operating principle.

That's the revolutionary new Sarco type TD. It has only one moving part...a hardened **SOLID** stainless steel disc. And it is not affected by superheat, water-hammer, corrosive condensate. That's why we can say **INSTALL IT—FORGET IT!**

Use the **SAME** trap for 10-600 psi...for light or heavy loads...without seat or valve change or other adjustments. Closes tight on no load—no steam waste.

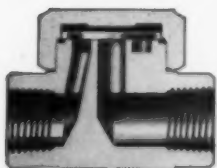
Ask for a 60 day trial installation of Sarco TD trap and strainer...write for bulletin 257. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

2150-9

SARCO

Only Sarco Makes All 5 Types

That's why Sarco can give impartial advice on proper steam trap selection.



SIMPLICITY ITSELF!

No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Only moving part a **SOLID** stainless steel disc.



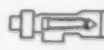
Thermodynamic
Steam Traps



Thermostatic
Steam Traps



Float
Thermostatic
Steam Traps



Liquid
Expansion
Steam Traps



Camlift Bucket
Steam Traps

**"We prevented field complaints
and motor Burnouts — by protecting
our sewing machine drive motors
with FUSETRON FUSES."**

"By 1949, increased sewing machine speed and stepped-up production tempo were putting an added burden on the drive motors we make for Singer Sewing Machine Co.

"It was necessary to find a more effective way to protect these industrial sewing machine motors — otherwise, we might expect increasing motor burnouts and field complaints.

"An extensive test was conducted on the application of Fusetron dual-element fuses of motor-running protection sizes. Our investigation showed that Fusetron fuses, because of their time-lag, would hold the motor starting current. They also would absorb the current surges resulting from starting the sewing machines 40 or more times per minute.

"In addition, Fusetron fuses would safely take the motor off the line if the branch circuit was single phased. We were particularly interested in this finding because we knew this type of power supply fault could give us a lot of trouble.

"On the basis of our tests, we decided to provide individual Fusetron fuse protection as standard equipment.

"As we expected, this decision practically eliminated motor burnouts and prevented field complaints."

R. D. Ingalls,
CHIEF ENGINEER

DIEHL Mfg. Co.
Electrical Division of
The Singer Manufacturing Co.
SOMERVILLE, N. J.

***Play Safe! install Fusetron Fuses and BUSS Hi-Cap
Fuses throughout the entire Electrical System.***

You too, can eliminate
Protection Troubles with
FUSETRON FUSES . . .
They provide 10 point
protection.

- 1 High interrupt capacity — protect against heavy short-circuits. Have proven on tests to open safely on circuits set to deliver in excess of 100,000 amperes.
- 2 Protect against needless blows caused by harmless overloads.
- 3 Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation.
- 4 Provide thermal protection — for panels and switches against damage from heating due to poor contact.
- 5 Protect motors against burnout from overloads.
- 6 Protect motors against burnout due to single phasing.
- 7 Give **DOUBLE** burnout protection to large motors — without extra cost.
- 8 Make protection of small motors simple and inexpensive.
- 9 Protect against waste of space and money — permit use of proper size switches and panels.
- 10 Protect coils, transformers and solenoids against burnouts.

**FOR LOADS ABOVE 600 AND
UP TO 5,000 AMPS., . . . Use
BUSS Hi-Cap Fuses**

They have an interrupting capacity sufficient to handle any fault current regardless of system growth.

They can be coordinated with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.



On new construction, tell your architect to specify this Safer, Better Protection.

256

For detailed information on Fusetron dual-element fuses and BUSS Hi-Cap fuses, write for bulletin FIS and HCS.

BUSSMANN MFG. CO. (Division of McGraw Electric Co.)
UNIVERSITY AT JEFFERSON ST. LOUIS 7, MO.



New Plants — Expansions

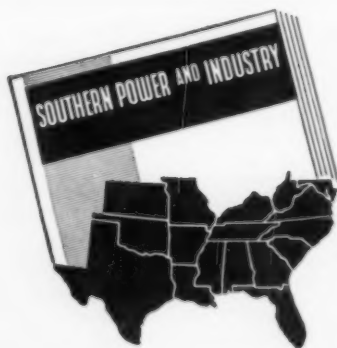
- ✓ Manufacturing Plants
- ✓ Utility Plants
- ✓ Large Service Plants

Highlights for April, 1956

South Atlantic States

American Cyanamid Company's 200,000 ton-per-day triple superphosphate plant at **Brewster, Fla.**, to be completed in mid-1957 . . . Multi-million dollar expansion program in **Bartow, Fla.** for the Bonnie plant of **International Minerals & Chemical Corp.**, will double the plant's capacity to 500,000 tons annually of triple superphosphate and feed grade dicalcium phosphate . . . \$1,000,000 cardboard box factory is underway for **Growers Container Corp.**, **Jacksonville, Fla.**, with production scheduled for July . . . 110,000 sq ft, \$1,500,000 plant for **Miami National Container Corp.** to be completed in May or June at **Miami, Fla.** . . . 150,000 sq ft printing plant for the "Miami News," costing \$5,000,000, is scheduled for construction in **Miami, Fla.** in the spring . . . Multi-million dollar addition to **Escambia Bay Chemical Corp.** plant in **Pensacola, Fla.**, will produce polyvinyl chloride resins . . . \$400,000 pier which will extend 800 ft into the Gulf is underway at **Pensacola, Fla.**

Fruehauf Trailer Co. plans construction of a 100,000 sq ft truck-trailer manufacturing plant in **Atlanta, Ga.** . . . Paint and varnish manufacturing unit will be housed in reconverted 60,000 sq ft building for **Dixie Paint & Varnish Co** at **Brunswick, Ga.** at a cost of \$1,000,000 . . .



Data taken from SPI's SOUTHERN INDUSTRIAL NEWS SERVICE, issued exclusively to SPI advertisers and their representatives throughout the South and Southwest.

\$13,000,000 **James McCoy Oliver dam** and hydroelectric plant will be built at **Columbus, Ga.** by **Georgia Power Co.** . . . **Schnable Co.**, **Pittsburgh, Pa.**, planning a refrigerated truck plant for **Griffin, Ga.** . . . **Hartwell, Ga.** is the site of the \$2,000,000 plant of **Monroe Auto Equipment Co.**, **Monroe, Mich.** . . . July completion is anticipated for **Dixie Aluminum Corp.**'s new operation, **Dixie Aluminum Tube Corp.** at **Rome, Ga.** . . . **Rockwell Mfg. Co.** has purchased the new 106,000 sq ft plant of **General Instrument Corp.** in **Statesboro, Ga.** for the manufacture of meters, valves and other products . . . 10,500 sq ft woodworking plant for **Separator Mfg. Co.** will be in production at **Waycross, Ga.** by spring.

Spring construction planned in **Frederick, Maryland** for **Alpha Portland Cement Co.**'s cement manufacturing plant which will have a capacity of 1½ million barrels annually . . . 75,000 kw generating unit costing \$13,000,000 will be begun in mid-1956 by **Potomac Edison Co.** at **Williamsport, Maryland.**

Charlotte, N. C. will see the construction of \$400,000 structure for **Sandoz Chemical Works, Inc.**, housing office, warehouse and laboratory . . . **Morganton, N. C.** is doubling the capacity of **Catawba River Plant** and is expanding **Upper Creek Plant** from 1 to 2 million gallons daily.

\$5,000,000 expansion for **Carolina Giant Cement Co.** at **Harleyville, S. C.**, will increase the plant capacity to 3,000,000 barrels per year . . . \$1,000,000 construction has been resumed at **Inman, S. C.** on the **Inman-Campobello water works** . . . Spring completion scheduled for the \$1,500,000 expansion of **Laurens Mills** at **Laurens, S. C.** . . . Plans are underway for 100,000 sq ft sales building of **Deering, Milliken & Co.** at **Spartanburg, S. C.**

Doubleday & Co., Inc. plans a book manufacturing plant at **Berryville, Va.** . . . Construction underway on \$4,500,000 aluminum extrusion plant for **Reynolds Metals** which will be in production late in the year at **Richmond, Va.**

\$60,000,000 **Kammer Power Station** underway at **Cresaps, W. Va.** . . . \$11,300,000 purchase, plus \$6,000,000 of renovation is being spent by **Goodrich-Gulf Chemicals** on the largest synthetic rubber installation in the country — at **Institute, W. Va.** . . . **Washington, W. Va.** will be the site of **Borg-Warner Corp.**'s \$10,000,000 plant for processing **Cycolac thermoplastic resin** into numerous

colors . . . **Weirton Steel Corp.** of National Steel Corp. plans construction of 6,000 ton per day sintering plant at **Weirton, W. Va.**

East South Central

120,000 hp generating facilities, costing \$30,000,000, are planned on Sipsey Fork (completion by 1959), affecting **Birmingham**, and Lock 17 (completion in 1960), affecting **Tuscaloosa, Ala.** . . .

600,000, 190 x 540 ft addition underway for the printing ink division of **Interchemical Corp.** at **Covington, Ky.** . . .

Pontiac-Eastern Corp. constructing \$18,000,000 oil refinery at **Hattiesburg, Miss.** . . . **Meridian, Miss.** will see the expansion of **A. DeWeese Lumber Co.** to the sum of \$265,000 with an additional \$250,000 expenditure scheduled for a later date.

\$25,000,000 expansion underway at **Calhoun, Tenn.** for **Bowater Southern Paper Corp.** . . . Plans are being laid for \$5,000,000 and \$8,000,000 expansion projects for **Tennessee Products and Chemical Corp.** at **Nashville, Tenn.**

West South Central

Construction underway on \$350,000 electric motor plant of **Emerson Electric Mfg. Co.** at **Paragould, Ark.** . . . **Woodlin, Inc.** is erecting a \$110,000 mobile home accessories plant at **Texarkana, Ark.** . . . \$18,000,000 polyethylene plant planned by **W. R. Grace & Co.** for **Gulf Coast area.** . . . **Esso Research Laboratories** plans a \$1,500,000 addition in **Baton Rouge, La.** to be completed in 1957.

Construction underway on \$7,000,000 natural gas ex-

traction plant at **Andrews, Tex.** for **Phillips Petroleum Co.** . . . \$2,363,000 plant underway for **Olive-Myers-Spaliti Furniture Co.** at **Athens, Tex.** . . . 290,000 sq ft fabricating plant planned by **Hobbs Trailers** in **Cleburne, Tex.** . . . Second phase of \$1,200,000 expansion project of **Corpus Christi Refining Co.** is underway and expected for completion in June at **Corpus Christi, Tex.** . . . Multi-million dollar aircraft factory planned for **Northrop Aviation Co.** at **El Paso, Tex.** on a 591 acre site . . . **Dresser Industries' Southwestern Industrial Electronics Co.** plans construction of a multi-million dollar electronics plant at **Houston, Tex.** . . . **Koeing Iron Works, Inc.** is erecting a \$425,000 metalworking plant at **Houston, Tex.** which will contain 25,000 sq ft of floor space . . . Plans are underway for construction of **Tennessee Gas Transmission Co.** dock and gas separator plant at **La Porte, Tex.** which will cost between \$1,000,000 and \$2,000,000 . . . With construction scheduled for May, **Firestone Tire & Rubber Co.** will build a 40,000 ton capacity butadiene manufacturing plant on a 1,000 acre **Orange, Tex.,** site . . . April construction scheduled for 1,000,000 kw generating plant for **Houston Lighting & Power Co.** at **Richmond, Tex.** with initial operation scheduled for April, 1958.

Kansas and Missouri

Carthage Water & Electric plant plans an expansion program of \$750,000 within next two years at **Carthage, Mo.** in the form of a 4,000 kw engine, plant addition and switchboard equipment . . . **Kansas City Power & Light Co.** is consolidating central headquarters at a cost of \$6,000,000 in **Kansas City, Mo.,** with completion scheduled for 1958 . . . 180,000 sq ft warehouse underway by **B. F. Goodrich** in **Kansas City, Mo.** . . . Construction planned for \$100,000-\$150,000 **Missouri Power & Light Co.** shop and storage building at **Mexico, Mo.**

FUTURE EVENTS of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Secretary, 29 West Thirty-Ninth St., New York 18, N. Y.

April 1-5, Oil and Gas Power Division Conference, Jung Hotel, New Orleans, La.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Secretary, 33 West 39th St., New York 18, N. Y.

April 2-4, Southwest District Meeting, Dallas, Texas.

INSTRUMENT SOCIETY OF AMERICA, Richard Rimbach, Secty., 921 Ridge Ave., Pittsburgh 12, Penna.

April 5-7, I.S.A. Regional Show, Birmingham, Ala.

ILLUMINATING ENGINEERING SOCIETY, A. Dexter Hickley, Exec. Secty., 51 Madison Ave., New York 16, N. Y.

April 5-7, Southern Regional Conference, Birmingham, Ala.

April 8-10, Southwestern Regional Conference, Hilton Hotel, Fort Worth, Texas.

ATOMIC ENERGY CONFERENCE, Headquarters—The First National Bank of Atlanta, Box 4148, Atlanta 2, Ga.

April 17-19, "Prospects for Atomic Energy in the South" at Atlanta Biltmore Hotel, April 17th & 18th; at Oak Ridge, Tenn., April 19th.

WORLD OIL EXPOSITION, Duane Ellis, President, Box 3105, Houston 1, Texas.

April 25-29, World Oil Exposition, Houston Coliseum and Show Grounds, Houston, Texas.

AMERICAN WELDING SOCIETY, 23 West 39th St., New York 18, N. Y.
May 9-11, Fourth Welding Show, Memorial Auditorium, Buffalo, N. Y.

SOUTHEASTERN INDUSTRIAL EXPOSITION, Roger E. Montgomery, Managing Director, Lakewood Park, Atlanta, Ga.

May 18-25, Southeastern International Industrial Exposition, Lakewood Park, Atlanta, Ga.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Secretary, 29 West Thirty-Ninth St., New York 18, N. Y.

Sept. 23-26, Petroleum-Mechanical Engineering Conference, Conrad Hilton Hotel, Dallas, Texas.

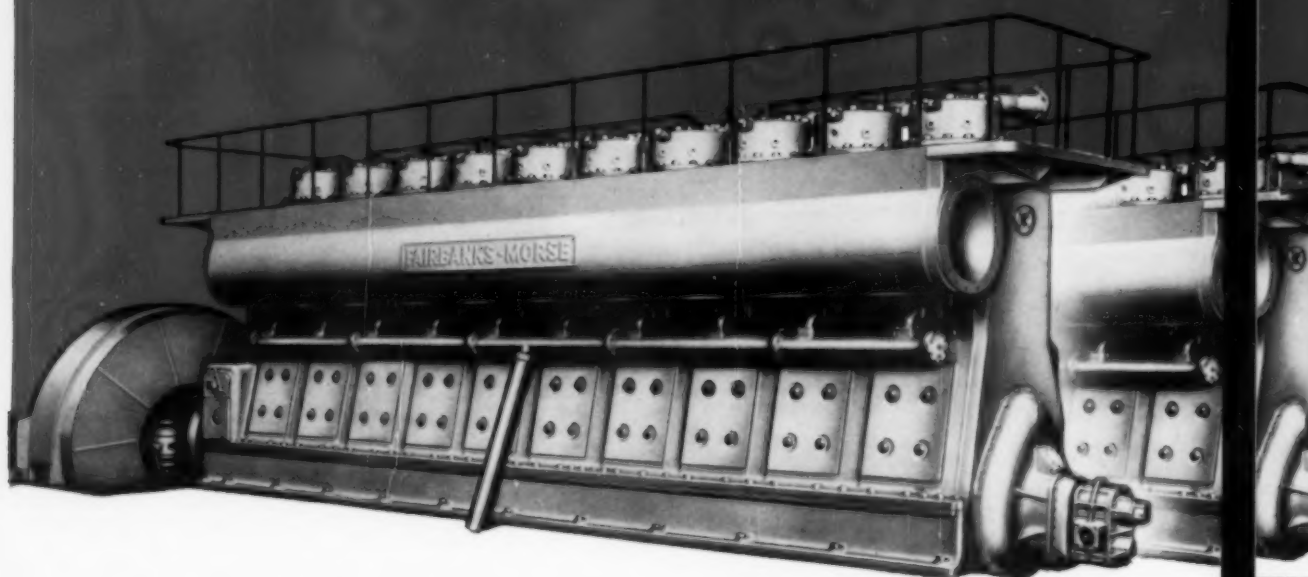
MATERIALS HANDLING—PACKAGING EXPOSITION, Industrial Packaging and Materials Handling Engineers, 20 West Jackson Blvd., Chicago 4, Ill.

Oct. 23-25, SIPMHE Exposition and Educational Short Course, St. Louis, Mo.

NATIONAL EXPOSITION OF POWER & MECHANICAL ENGINEERING, E. K. Stevens, Mgr., 480 Lexington Avenue, New York 17, N. Y.

Nov. 26-30, National Exposition of Power & Mechanical Engineering, New York Coliseum, Columbus Circle, New York City, N. Y.

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That winning record automatically selected the big No. 6 for the heaviest assignment to straight oil operation this year when gas supplies became short. Yet, the engine achieved an average of 9642 BTU per kw-h (Better than plant average) and during one period of operation maintained, an average of 8652.

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*The Johnson plant also delivered top kw-h per BTU last year, but was eliminated from competition due to winning in two previous years

WHERE TO GET IT *And How to Do It*



—INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE—

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

9 FREE COAL COUNSELING — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose. — NORFOLK AND WESTERN RAILWAY.

16 SMALL BOILER PERFORMANCE — Brochure shows how the package Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels. — THE AIR PREHEATER CORPORATION.

25 PACKAGED BOILERS — New bulletin PSG-2 shows construction details and table of capacities, dimensions and weights for nine sizes of units. — HENRY VOGT MACHINE CO.

41 PACKAGED DRAFT INDUCER — Bulletin I-55—Shows how space problems can be solved by the company's packaged power plant draft inducer. Units may be turbine or motor-driven. Fan and bearing assembly may be withdrawn from housing for inspection and servicing. — L. J. WING MFG. CO.

75 INDUSTRIAL BURNERS—Form AD-101, 4 pages—Describes and illustrates the Hev-E gas and combination oil and gas burners for commercial and industrial use. Also described are the forced draft system and electronic controls, with charts showing capacities for five models.—CLEAVER-BROOKS COMPANY.

76 GAS BURNER — Bulletin — Describes the Rectilinear gas burner, an application of the venturi principle which provides high input through narrow rectangular openings for firing — in a horizontal plane through fire doors or small openings over handfired coal grates or stokers — or for firing in a vertical

plane on either side of stoker or oil burner. — THE WEBSTER ENGINEERING COMPANY.

87 STEAM TURBINES — Single Stage — Bulletin 500 describes features and characteristics of company's type DH steam turbines in horizontal and vertical models. — DEAN HILL PUMP COMPANY, INC.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

116 AIR & GAS COMPRESSORS — Form 3132-A shows complete range of centrifugal and reciprocating units used in process and chemical industries—for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfm. — INGERSOLL-RAND COMPANY.

144 FLUID DRIVES — CATALOG, 24 pages — Describes and illustrates Type VS Class 4 Gyrol fluid drives. Eight sizes are listed, with speeds to 1800 rpm and 100 to 2500 hp. — AMERICAN BLOWER CORPORATION.

160 BOILER FEED PUMPS — 12-page bulletin 122 describes and illustrates the type BFI high pressure pumps. Design features, service ratings and engineering data included.—PACIFIC PUMPS, INC.

165 AFTER-COOLER — Bulletin 130 shows how the Aero unit removes moisture from compressed air or gases, cools water for jackets and intercoolers, cools air or gases in both power and process systems, and protects air tools and pneumatic systems from water damage.—NIAGARA BLOWER COMPANY.

167 ROTARY PUMPS — Bulletin 307 — Describes the features and advantages, and outlines the engineering de-

tails of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts. — BLACKMER PUMP CO.

168 BOILER FEED PUMPS — Catalog highlights the new DVMX split case pump engineered for medium size power plants; delivers capacities to 2200 gpm, heads to 1200 psig, and temperatures to 350 F. Split case permits removal of top half of case and complete rotating element without disturbing the piping. — BYRON JACKSON, Division of Borg-Warner Corporation.

173 PUMP CALCULATIONS — Melvin Mann, Chief Proposition Engineer of Peerless presents a technical article concerning the Calculations and Use of System Head Curves in pumping problems.—PEERLESS PUMP DIVISION, FOOD MACHINERY & CHEMICAL CORP.

INSTRUMENTS—METERS CONTROLS—REGULATORS

209 LIQUID LEVEL CONTROLS — Catalog describes controls for almost any liquid, at any pressure, at any temperature. Can be furnished in top-mounting, side-mounting styles, or as external float cage units. Almost unlimited application. — MAGNETROL, INC.

211 FLUID CONTROL VALVE — Bulletin CV-1 describes "Bellofram" construction where no force is lost at end of the stroke where spring compression requires maximum force. Sizes start at ½". — FOSTER ENGINEERING COMPANY.

212 AUTOMATIC TEMPERATURE CONTROL — Data sheets describe versatile automatic indicating tem-

perature control offering many sequence combinations — step-heating, heating and cooling, wide limit control, or temperature control plus operation of signal devices.— SARGO COMPANY, INC.

226 PRESSURE GAUGES — Ashcroft Gauge Catalog, 124 pages — Information on pressure gauges, gauge accessories and gauge engineering, sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings. — MANNING, MAXWELL & MOORE, INC.

235 LIQUID LEVELS — Bulletin 532 describes indicator which gives a reliable, automatic reading of storage tank contents. 20" dial in 3 x 10" case saves panel space. No outside power source needed; can be located up to 250 ft from tank. — THE LIQUIDOMETER CORP.

240 TEMPERATURE CONTROL — Bulletin 316 describes Accritem regulator for controlling water heaters, heat exchangers, and processes. Use where pressure and load conditions fluctuate widely and for control of large size valves. — THE POWERS REGULATOR COMPANY.

242 CONTROL VALVES — Catalog 1500-B — Illustrated — Describes complete line of Domotor, solenoid-operated and handwheel single seat control valves for handling difficult fluids under extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and directional flow flexibility. — THE ANNIN COMPANY.

293 TROUBLE FREE RECORDING — E12-5 describes new hermetically sealed, non-evaporating, non-corrosive inking system on company's recorders. Transparent plastic ink sacs are changed once a year. Capillary tubing carries fresh, clean ink to pens continuously without day-to-day attention.— BAILEY METER COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

300 CAST IRON WELDING — Data sheets describe the new Xyron 2-25 strontium-aluminum bearing electrode for crack-free welding of gray and ductile cast iron, including Meehanite, Ni-Resist, and for joining cast iron to steel. — EUTECTIC WELDING ALLOYS CORP.

305 INDUSTRIAL HEATING—Catalog 50, 50 pages — Gives data on the type and size of electric heating units

and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications. — EDWIN L. WIEGAND CO.

309 ELEVATED STEEL TANKS — 16-page "Tank Talks" shows various types of tanks constructed and erected by manufacturer as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, etc.—R. D. COLE MANUFACTURING COMPANY.

318 WROUGHT IRON — "ABC's of Wrought Iron" — A concise digest of more detailed technical handbook material on wrought iron — describes resistance to corrosion, fabrication process — where needed — shock and vibration endurance. — A. M. BYERS.

335 BREECHINGS, STEEL OR IRON — Catalog 300-B — Describes breechings of steel or iron for use in industrial, power and utility plants — standard or tailored to the job. — J. J. FINNIGAN CO., INC.

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415	432	433	451	483	500	501	564	576	595
596	602	608	621	633	657	666	694	700	705
718	723	725	735	745	757	764	801	811	864
P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P-10
P-11	P-12	P-13	P-14	P-15	P-16	P-17	P-18	P-19	P-20
P-21	P-22								

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**PIPING, VALVES, FITTINGS
STEAM SPECIALTIES, TRAPS**

402 FORGED STEEL VALVES — 22-page supplement of Catalog F-9 covers new general purpose gate, globe and angle valves for 150-800 lb service. Featuring hard faced seating surfaces. — HENRY VOGT MACHINE CO.

413 REDUCING VALVE — Bulletin 553 gives graphic performance comparison and capacity data of the new "Hi-Flo" valve for water reducing stations, fuel oil pressure control, process lines, etc. — LESLIE CO.

414 SAFETY VALVE — Bulletin 730 describes new all-purpose safety valve designed for steam generator service. Requires less headroom and smaller discharge piping. Sizes 1½" through 6"; Pressures up to 250 psi; Temperatures up to 450 F. — MANNING, MAXWELL & MOORE, INC.

415 WELDING PIPE FITTINGS — New catalog illustrates where to use Weldolet and Thredolet branch pipe fittings. Specific areas of application shown with correct installation procedure. Describes complete range of stainless, alloy and non-ferrous fittings and Bonney's new marking standard. — BONNEY FORGE & TOOL WORKS.

432 ALUMINUM JACKETING — Data sheets describe low first-cost, long life jacketing for weatherproofing of insulated lines, towers, vessels and tanks. Lap-Seal design feature makes more positive weather seal. — CHILDERS MANUFACTURING COMPANY.

433 RENEWABLE SEAT RING GATE VALVE — Bulletin V-123 shows how you can replace seat rings in less than 10 minutes with valve body still installed in the line. 200 lb valves available in sizes ½" through 3". — THE FAIRBANKS COMPANY.

451 AIR RELIEF TRAPS — Bulletin No. 2062 — Describes application of ball float traps for venting air from hot water heating systems, water service lines, etc. Hook-up drawings, prices included. — ARMSTRONG MACHINE WORKS.

483 UNIONS & SWING CHECKS — Catalog 11, 34 pages — Gives engineering data and specifications on a complete line of hot forged steel pipe unions and swing check valves. Special section devoted to Double-Start Unions, which provide faster opening and closing. — CATAWISSA VALVE & FITTINGS COMPANY.

**MAINTENANCE PACKING
GASKETS, LUBRICATION**

500 LININGS & COATINGS — Brochure 7008, 4 pages, describes company's rubber, neoprene and polyvinyl chloride lining and coating service for pipes, valves, tanks, ducts, vessels, etc. Provide protection against corrosion and abrasion in handling acids, bases, salts and fumes; coatings conductive or non-conductive, soft or hard, suitable for high or low temperature operations. — RADIATOR SPECIALTY CO.

501 LUBRICATORS — Catalog 28G, 12 pages — Illustrates and describes new design high pressure force feed lubricators for service up to 30,000 lb, for use in chemical plants, utility plants and the like. Dimensions, specifications,

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415	432	433	451	483	500	501	564	576	595
596	602	608	621	633	657	666	694	700	705
718	723	725	735	745	757	764	801	811	864
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P-21	P-22								

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illustrations of typical installations. — MANZEL DIVISION OF HOUDAILE INDUSTRIES, INC.

564 ANTI-CORROSIVE PAINTS — Bulletin, "The Application of Subox and Subalox Paints" — Gives the story of a complete paint system for weather, moisture and alkali protection, with details as to application. — SUBOX, INC.

576 MECHANICAL SEALS — Bulletin 455 illustrates and describes line of Dura Seal rotary mechanical seals for application on centrifugal and rotary pumps, autoclaves, agitators, blowers and similar rotating equipment. — DURAME-TALLIC CORPORATION.

595 PLANT LUBRICATION — The Lubriplate Service Handbook — Gives valuable information on the subject of lubrication in all its forms, intended to be of everyday use to plant superintendents, managers, maintenance engineers and those in charge of plant production and maintenance. — LUBRI-PLATE DIVISION, FISKE BROTHERS REFINING CO.

596 TUBE CLEANERS & EXPANDERS — Catalog 77 covers tubes in high pressure boilers, superheaters, economizers and other heat exchange equipment. Model 38 expander rolls and flares in single operation. — THOMAS C. WILSON, INC.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

602 TRAMRAIL SYSTEMS — 12-page Booklet 2008-L covers principal components used in tramrail systems, stresses developed in tracks, and track peening and its solution. Gives case study illustrations. — CLEVELAND TRAM-RAIL, DIV.

608 CONVEYOR BELT REPAIRS — Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made. — FLEXIBLE STEEL LACING COMPANY.

621 POWER TRANSMISSION AND EQUIPMENT — Catalog 40 — Gives comprehensive details of a complete line of power transmission including V-Belt drives, flat belt drives, pulleys, gears, chains, sprockets. — Industrial Division of CONTINENTAL GIN CO.

633 DISPATCH SYSTEMS — Bulletin AD-1—Illustrates complete range of overhead carriers equipped for automatic transfer and dispatch of materials under varying conditions in various industries. — AMERICAN MONORAIL CO.

657 MATERIALS HANDLING—Catalog T-54, 34 pages — Gives structural details, specifications, engineering data, photographs on over fifty models of Fairbanks two-wheel and platform trucks, including hand trucks, steel framed platform trucks, lift jack platform trucks, wagon trucks and dollies. — THE FAIRBANKS CO.

666 ELECTRIC POWER DRIVES — 12-page catalog contains cut-away drawings illustrating various features of variable speed and slow speed gear reduction units, and totally enclosed splash-proof motors. Includes mounting and control information. — STERLING ELECTRIC MOTORS.

694 STOCK ROLLER CHAINS AND SPROCKETS — Catalog No. 754, 66 pages — Describes and illustrates Stock roller chains and sprockets including minimum and finished bore, ready-to-use Taper-Lock bushed sprockets, as well as chain selection and application data. — DIAMOND CHAIN COMPANY, INC.

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See Service Cards

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700 WATER CONDITIONERS — 4-page brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

705 TEST YOUR TOWER — Bulletin offers simple, proven method by which you can determine how closely your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. Know your tower's capabilities and limitations. — THE MARLEY COMPANY.

718 ZEOLITE SOFTENERS — 32-page catalog 4520-B describes the sodium zeolite softening process in detail. Contains data required for proposals, lists factors important in selection of proper zeolite material and in sizing of equipment. Single valve controls all cycles of service and regeneration. — COCHRANE CORPORATION.

723 DUST COLLECTION — Catalog describes mechanical and electrical systems which meet most rigid anti-air-pollution codes; low resistance fly ash

collector which combines top efficiency with low draft loss, for natural or forced draft installations. — BUELL ENGINEERING COMPANY.

725 COOLING TOWER — Bulletin CT-56-1 gives construction and operational details of new induced draft cooling tower. — FOSTER WHEELER CORPORATION.

735 REFRIGERATING MACHINE — Bulletin 1426 describes the Tonrac single-stage hermetic centrifugal refrigerating machine, which maintains constant chilled-water temperature regardless of load. Single level construction simplifies installation. — AMERICAN BLOWER CORPORATION.

745 DUST & FUME CONTROL — 40-page booklet gives helpful information on recovering dusts, fly ash, mists, fumes and other suspensions of gases. Summarizes important points design and plant engineers should know about electrical precipitators. — WESTERN PRECIPITATION CORPORATION.

757 DEMINERALIZATION — Bulletin WC-111, 24 pages — Explains chemical and mechanical factors entering into design and operation of demineralization plants for obtaining high quality process and boiler feedwater from wide range of water supplies under various operating conditions. — GRAVER WATER CONDITIONING CO.

764 COOLING EQUIPMENT — Bulletin 80-D describes company's complete line of commercial and industrial equipment — operating principles, design features, etc. — FRICK CO.

ELECTRICAL

801 MOTORS — Bulletin describes and catalogs more popular a-c motors from 1 to 500 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

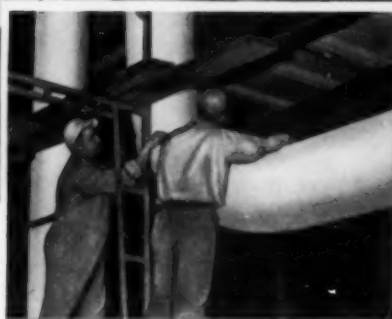
811 ELECTRIC HEAT — "100 Ways to Apply Electric Heat" gives a wealth of informative data on the use of electric heat in industry—fast, uniform, dependable, backed by nation-wide engineering service. — EDWIN L. WIEGAND CO.

864 ELECTRICAL SYSTEM PLANNING — Book C-57 — "Power Up," 51 page book on electrical system planning, maintenance and modernization for industrial plants. Important sections on installation and maintenance of industrial electrical distribution systems; wire cable and conduit data; motor application data; and electrical systems reference data. — ANACONDA WIRE & CABLE CO.

Economy... on
47 miles of piping
 AT GEORGIA POWER COMPANY'S
 NEW PLANT HAMMOND

47 miles of Johns-Manville 85% Magnesia Insulation boosts operating efficiency of Plant Hammond, one of the South's largest and most modern private utility installations.

Insulating feed water line at Plant Hammond. Contractor for this job was Brooks-Fisher Insulating Company of Atlanta, Georgia.



J-M 85% Magnesia Insulation helps cut fuel rate 25% below national average

Officials of the Georgia Power Company were gratified when the coal rate of their new Plant Hammond worked out at 0.75 lb. per KW HR, 25% below the national average. In their annual *Electrical Industry Statistics*, *Electrical World* had reported that increased efficiency in the techniques of power production has lowered the average coal rate to 1 lb. per KW HR. in 1954.

An important factor contributing to Plant Hammond's high efficiency


was the selection of insulation. Johns-Manville's 85% Magnesia was applied in the most economical thicknesses throughout the plant for all piping and equipment operating in its temperature range. At higher temperatures 85% Magnesia was used in combination with J-M Superex® diatomaceous silica insulation.

This is only one of thousands of case histories where J-M 85% Magnesia has helped industry achieve outstanding fuel savings and increased

operating efficiency. In all types of manufacturing and processing plants it is the standard for temperatures to 600F . . . providing high insulating value, easy application, long life, initial low cost and minimum maintenance. Write today for further information on J-M 85% Magnesia and Johns-Manville's complete drawing-board-to-job-site insulation service. Address Johns-Manville, Box 60, New York 16, New York. In Canada, Port Credit, Ontario.



Johns-Manville *first-in* **INSULATION**
 MATERIALS • ENGINEERING • APPLICATION



**NOW... greater piping loads,
longer travels, with less headroom**

The Grinnell Model R Constant-Support Pipe Hanger is available now in an *extended range* of sizes to provide completely overlapping coverage of loads from 47 lbs. to 32,267 lbs., and with travels up to 12 inches. New design modifications permit these hangers to be installed with a minimum of headroom, ranging from 29 inches (rod take-out) for the largest size — down to 10¾ inches for the smallest size.

The Model R provides constant support which is mathematically perfect for all positions of travel. This constancy of support is maintained throughout the full range of field adjustability. Needle bearings minimize friction.

Grinnell Constant-Supports are individually calibrated to support the exact load specified. All Model R Constant-Supports have a full 70 percentage points of field adjustability built into them. No less than 10% of this adjustability is allowed either side of calibration for plus or minus change in load. Field re-adjustments are easily made by turning a single load adjustment bolt.

Grinnell designs, manufactures, and distributes a complete line of pipe hangers and supports for every piping requirement. Grinnell maintains an experienced staff of engineers in the field — ready to assist you on the job with any piping problem.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS



Grinnell Company, Inc., Providence, Rhode Island

Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

TERRY SOLID-WHEEL *SIMPLICITY*

MEANS SUSTAINED HP



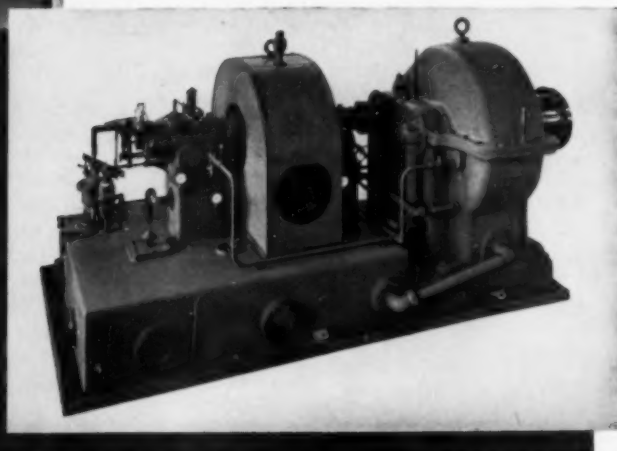
A Terry solid-wheel turbine is simplicity itself. Particularly the rotor. This is a single forging of special composition steel. And, unlike a built-up wheel, has no separate parts to loosen or work out.

Blade wear which might occur after years and years of usage is of little consequence, because the power-producing action of the steam takes place on the curved surfaces at the backs of the buckets. Thus wear does not materially affect horsepower or efficiency.

The blades can't foul. There is a one inch clearance on either side of the wheel and, in addition, the blades are double rim protected. There is no need for close axial blade clearance, because the steam enters the buckets at right angles to the shaft.

Perhaps you, too, can profit from Terry solid-wheel stamina. Bulletin S-116 gives complete details. Send for a copy today.

TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD 1, CONNECTICUT



This Terry solid-wheel turbo-gear unit is rated 600 hp, 4000/650 rpm for 820 psi, 825°F steam with 275 psi back pressure.

TERRY

TT-1201

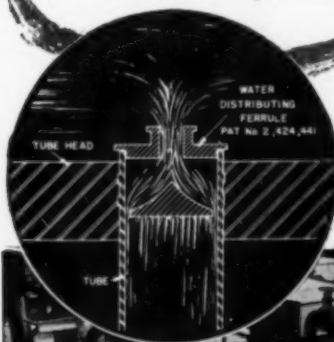
\$ave Power

and

REFRIGERATION COST

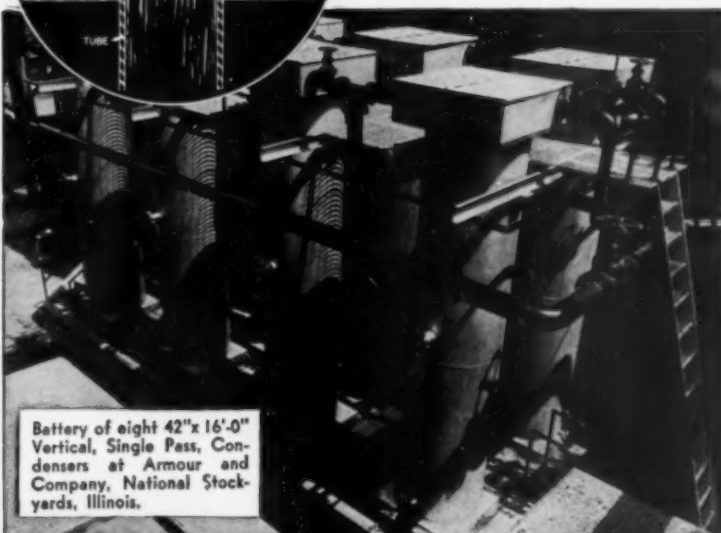
Vogt Condensers, because of their correct design, STEP UP the rate of heat transfer and STEP DOWN head pressures. With the liquid delivered at a lower temperature, smaller compressor capacity is needed, saving in original as well as operating costs.

One of the two basic types illustrated will fit your operations exactly. Install Horizontal Multipass (closed type) for use with clean waters. Where the water is hard, forms scale, contains mud or promotes fungus growth, Vertical Single Pass (film type) which can be cleaned in operation, are recommended.



Vertical Single Pass Condensers (Film Type)

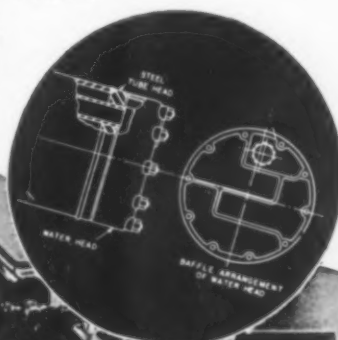
Patented ferrules give equal distribution of water to and over the surfaces of all tubes in a unit.



Battery of eight 42"x 16'-0" Vertical, Single Pass, Condensers at Armour and Company, National Stockyards, Illinois.

Horizontal Multipass Condensers (Closed Type)

Water circulated in tubes traverses the length of the unit a number of times as determined by baffles in the heads.



HORIZONTAL and VERTICAL TYPES SHELL and TUBE CONDENSERS For Every Service

Write For Bulletin RC-2
Dept. 24-IRS

HENRY VOGT MACHINE COMPANY
INCORPORATED
1000 W. ORMSBY ST., LOUISVILLE 10, KY., U.S.A.
Branch Offices: NEW YORK, CHICAGO, CLEVELAND, DALLAS,
PHILADELPHIA, ST. LOUIS, CHARLESTON, W. VA.

Vogt REFRIGERATION CONDENSERS

Egad!

**will wonders
never cease?**

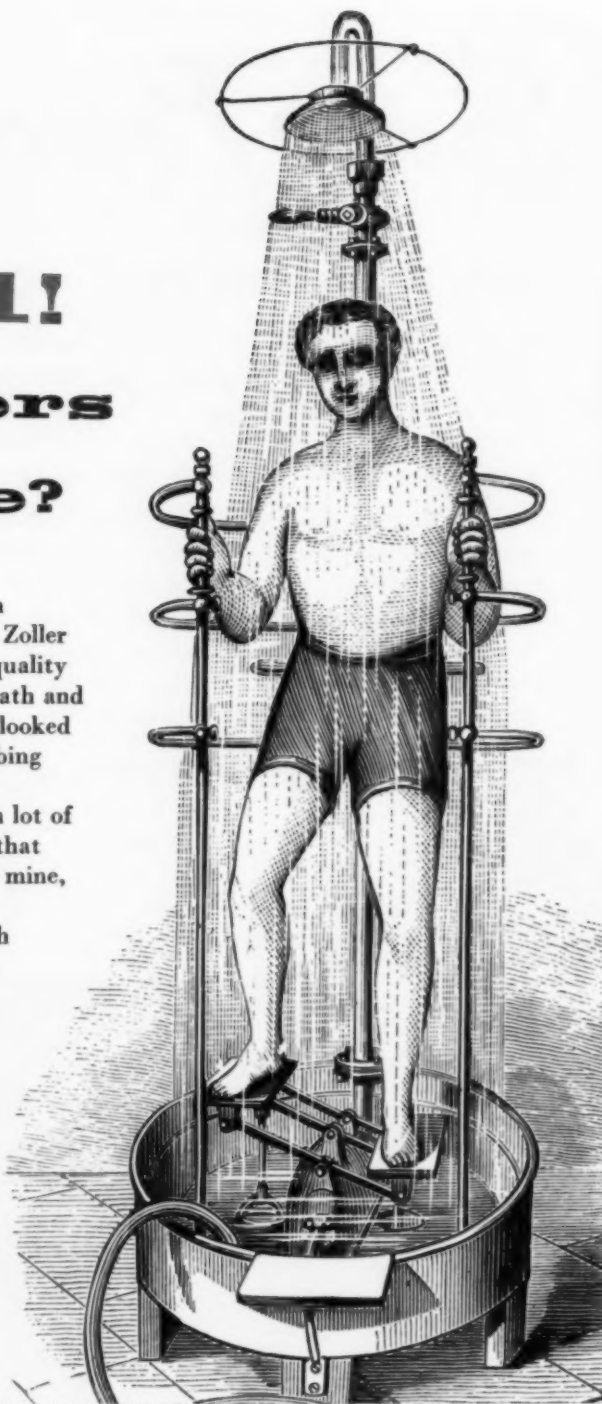
Patented! Warranted! A marvel of modern ingenuity! Yes, back in 1886, when Bell & Zoller first started marketing their famous high-quality coals, this combination leg-pump shower bath and morning workout was all the rage—and it looked like the new-fangled fad of "indoor" plumbing was here to stay!

Yes, we've come a long way, and made a lot of changes since then. But there's one thing that hasn't changed. 70 years ago we set out to mine, process and deliver the best possible selection of free-burning, high-heat, low-ash coals—by the best, low cost, most modern methods available.

And we're still doing that job in 1956!

★ ★ ★

You know these coals by the famous brand names of ZEIGLER, MOSS HILL, ORIOLE, MURDOCK, LIBERTY SMOKELESS, BUCKHORN...and you can be sure of fast, low cost delivery through your nearest Bell & Zoller office—today!



Bell & Zoller Coal Company

BELL BUILDING, CHICAGO 1, ILLINOIS

Detroit • New York • St. Louis • Minneapolis
Omaha • Milwaukee • Louisville • Washington, D.C.
Terre Haute, Ind. • Mount Hope, W. Va.

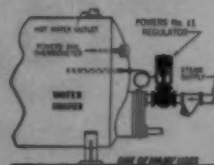


WHY POWERS No. 11 REGULATORS Give BETTER CONTROL and Last Longer

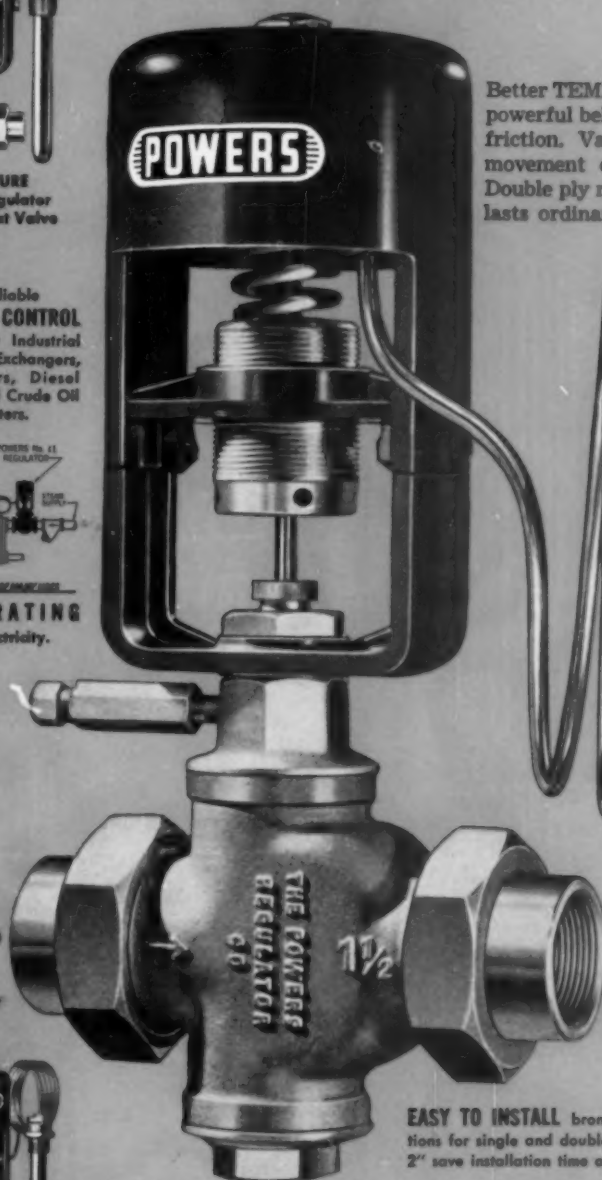


TEMPERATURE
Indicating Regulator
with Single Seat Valve

Simplest, Reliable
TEMPERATURE CONTROL
made for: Many Industrial
Processes, Heat Exchangers,
Air Compressors, Diesel
Engines, Fuel and Crude Oil
Heaters and Treaters.



SELF OPERATING
Needs no Electricity.



Balanced
(Double Seat)
Valve

Controls
Flow of
Steam, Water
or Gas

EASY TO INSTALL bronze union connec-
tions for single and double seat valves thru
2" save installation time and labor.



(c44)

Above: Flanged Iron Body
Valve with Double
Seat for sizes above 2"

● **15 to 20 Years of reliable service** is often reported by users of Powers Temperature Regulators. Since 1891 they have been noted for their sturdy construction and dependability.

● **Right type of Regulator and the right size valve** is important for best control. From Powers complete line of self operating regulators and air operated temperature controllers you can be sure of

getting the type best suited for your requirements. Call our nearest office or write us direct, 3400 Oakton St., Skokie, Illinois. Offices in Chief Cities.



Since
1891

THE POWERS REGULATOR COMPANY

SOUTHERN OFFICES

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Announcing General Electric's 1956 RM



Load-Tap-Changing Transformer

- Maintenance Reduced 50%
- 20db Switching Noise Reduction

INCREASED CONTACT LIFE in General Electric's new LRT-68 load-tap-changing switch means routine inspection and maintenance can be cut by 50% on G-E LTC medium transformers.

These savings have been made possible by: (1) reducing the amount of contact wear per operation, through redesigning the Geneva gear (providing smoother operation) and adding hydraulic dashpots (for optimum separation and engagement speeds) and (2) using heavier, thicker contact tips, from which more material can wear before replacement is necessary.

QUIETER OPERATION results from redesign of

G.E.'s load tap changer. New Geneva gear is quieter, and mounting of motor and drive assembly under oil in switch compartment muffles noise. These features provide increased customer goodwill and less investment in sound-reducing barriers in residential areas.

RM (Repetitive Manufacture) brings you these savings in the entire line of LTC medium transformers. Also, RM transformers can be delivered to you faster . . . important in case of emergencies. For complete information, contact your G-E Apparatus Sales office, or write to Section 416-5, General Electric Company, Schenectady 5, N. Y.

Progress Is Our Most Important Product

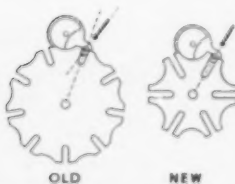
GENERAL  ELECTRIC



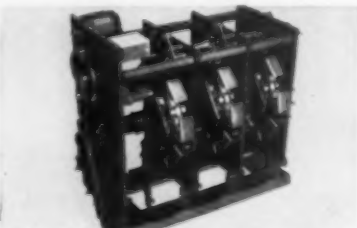
NEW HYDRAULIC DASHPOTS provide optimum separation and engagement speeds to minimize erosion and secondary arcing—increasing tip life.



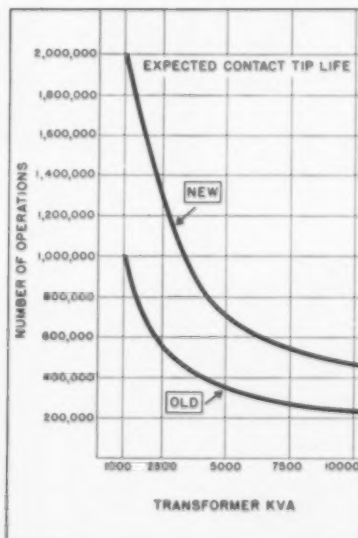
NEW FEATURES of LRT-68 switch are hydraulic dashpots and redesigned, quiet-acting Geneva gear shown in detail at left.



NEW GENEVA GEAR driving pin enters smoothly instead of 19° angle. This reduces jarring and impact, cuts noise, extends contact life.



NEW LOAD TAP CHANGER now incorporates motor and drive assembly. Oil immersion muffles noise, provides permanent lubrication.



NEW MAINTENANCE RECOMMENDATIONS are based on increasing the expected tip life, up to 2,000,000 operations for a 1000-KVA transformer.

To See More of the Advantages of G-E's New RM Transformer for '56

TURN PAGE →

**All
the features
you asked for
make**

1956

Load-Tap-Changing

**RM* Medium
Transformers**

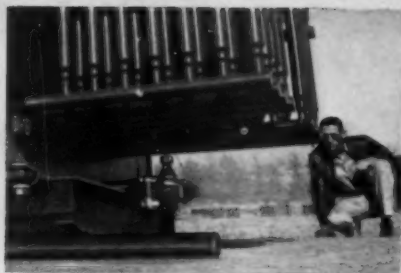
Your Best Buy

***Repetitive Manufacture**

*Progress Is Our
Most Important Product*



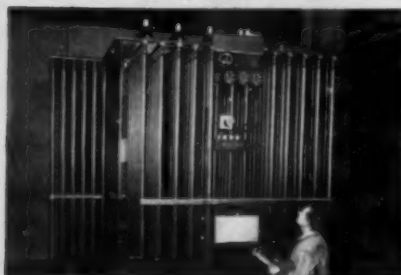
**GENERAL
ELECTRIC**



SLED-RUNNER BASE on all G-E RM transformers slides easily or rides smoothly over rollers, simplifies installation. Wide face on I-beam won't cut rollers.



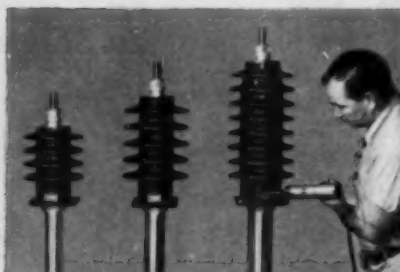
LIBERAL JACKING SPACE cuts installation time and effort. Minimum of 5½ inches from ground to jackpad suitable for most jacks.



CONTROL CENTER groups all instruments and nameplate; improves visibility, makes readings extra simple.



PROTECTED ACCESSORIES. Recessed behind cooling tubes; sheltered against damage during shipping and installation.



AMERICAN STANDARD BUSHINGS, used on all General Electric RM Power Transformers, help reduce bushing inventories.

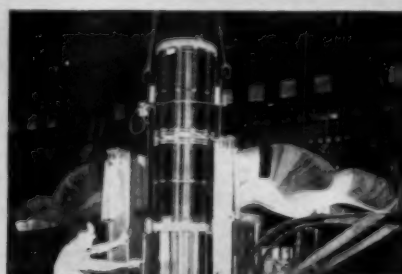


FULL DRAIN permits complete filtration, removes worst bottom oil. Sampling is more accurate.



FORMEX* insulation is extremely rugged, has phenomenally high dielectric strength. Permits smaller, lighter units.

*Reg. Trade-mark G. E. Co.

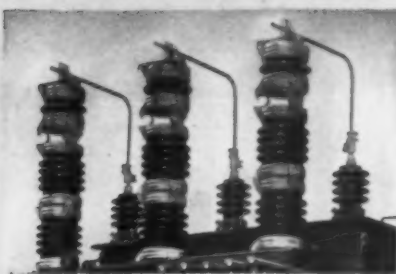


PRE-FORMED CORE gives reduced losses since flux path follows grain in core laminations.

**SPR.
RM
Insta**



VENTILATED BASE permits free air circulation, protects against condensation, adds years between repainting.



PRE-FITTED CONNECTORS between arrester and bushing simplify field installation, give better lightning protection.



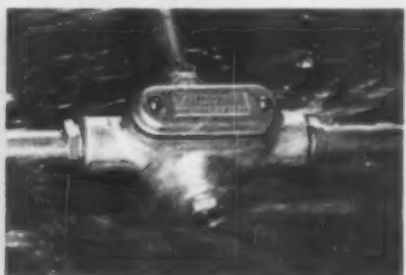
REVERSIBLE JUNCTION BOX readily adapts to overhead or underground system, simplifies ordering and interchangeability.



ONE CONTROL CONDUIT simplifies control wiring. Connections are made to one terminal board for entire transformer.



TILTED INDICATORS, where height requires, make instrument reading easier, more accurate.



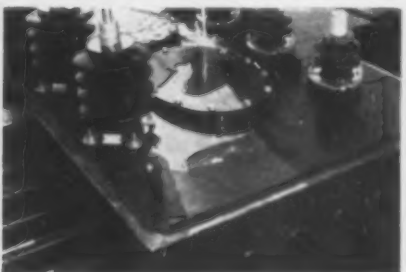
CONDUITS AND FITTINGS are weather-tight, can be assembled in minutes without cutting threads.



NITRILE GASKETS resist weathering, seal without adhesives. Reusable again and again, they reduce gasket inventories.



SUPER MELAGLYP FINISH saves up to two repainting, is longer lasting in corrosive atmospheres.



DOMED COVERS let water run off, help prevent dirt and rust accumulations. Flanged openings prevent foreign matter, moisture from rolling into tank.



SPRAY-ON PAINT, provided with every RM transformer, permits touching up after installation, before rust gets foothold.



WEDGE-TYPE TAP CHANGERS have self-aligning, rugged contacts; can carry full short-circuit current.



LARGER MANHOLES mean easier accessibility to interior; allow better and easier inspections.

GENERAL  **ELECTRIC**

You could write a book on **COAL...**
 ...and so could we!



Coal is a big factor in your business, and in ours, too. You study it, and so do we. With this in common, maybe the old thought that two heads are better than one will apply here—to our mutual gain. Such friendly collaboration could lead to your better utilization of coal for heat, power or special purpose, and perhaps broaden our experience, too.

Competent coal counseling service is available without obligation in eight strategically located cities where the N&W maintains coal bureaus. These offices are staffed by men who are well equipped to advise you on how to get the most out of coal. Let these men tell you all about Fuel Satisfaction—the superior all-purpose Bituminous Coal mined along the N&W—and how its use can benefit your operation.

There is a lot more to buying coal than the cost per ton. Please don't hesitate to call the coal bureau nearest you for information about any coal utilization problem.

ROANOKE

N&W Coal Traffic Dept.
 Telephone 4-1451,
 Ext. 423, 313, 249
 Roanoke 17, Virginia

BOSTON

833 Chamber of
 Commerce Building
 Telephone Liberty 2-2229
 Boston 10, Massachusetts

CHICAGO

Room 604,
 208 South LaSalle Street
 Telephone RAndolph 6-4634
 Chicago 4, Illinois

CINCINNATI

908 Dixie Terminal Building
 Telephone DUnbar 1-1325
 Cincinnati 2, Ohio

CLEVELAND

1819 Union Commerce Building
 Telephone MAin 1-7960
 Cleveland 14, Ohio

DETROIT

1907 Book Building
 Telephone
 WOodward 1-2340 or 1-2341
 Detroit 26, Michigan

ST. LOUIS

Room 1201, 1218 Olive Street
 Telephone MAin 1-1180
 St. Louis 3, Missouri

WINSTON-SALEM

1105 Reynolds Building
 Telephone 7116
 Winston-Salem 1, North Carolina



Norfolk and Western
RAILWAY

CARRIER OF FUEL SATISFACTION

Powell Lubricated Plug Valves



Fig. 3059 (Sectional) A.S.A. 300-pound Steel Lubricated Plug Valve

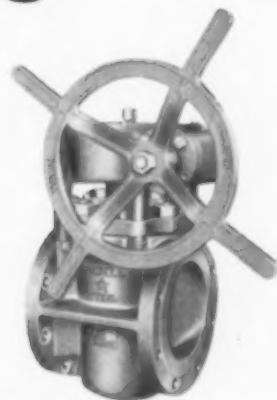


FIG. 1559G—150-pound Steel Lubricated Plug Valve. Gear operated



FIG. 2200—175-pound W.O.G. Semi-Steel Lubricated Plug Valve

Powell Lubricated Plug Valves maintain the 110-year tradition of quality and precision. Only the finest available materials are used. And painstaking quality control is rigidly enforced through each and every step of manufacture.

Valve users who want one source of supply for lubricated plug as well as all types of bronze, iron, steel and corrosion-resistant valves will want full details on Powell Lubricated Plug Valves.

For example, features include quick and positive operation—just a quarter-turn to open or close. Lubricant grooves surrounding each port provide a positive seal when the valve is closed. In an open position, seating surfaces are not exposed. Available in Steel and Semi-Steel through distributors in principal cities.

For full details, write for the new PV-4 Catalog on Powell Lubricated Plug Valves. Just fill out the coupon and mail. Of course there's no charge, no obligation.

THE WM. POWELL COMPANY
2525 Spring Grove Ave.
Cincinnati 22, Ohio

Gentlemen:

Please send me a copy of your PV-4 Catalog on Powell Lubricated Plug Valves. It is understood that there is no cost, no obligation.

name _____

title _____

company _____

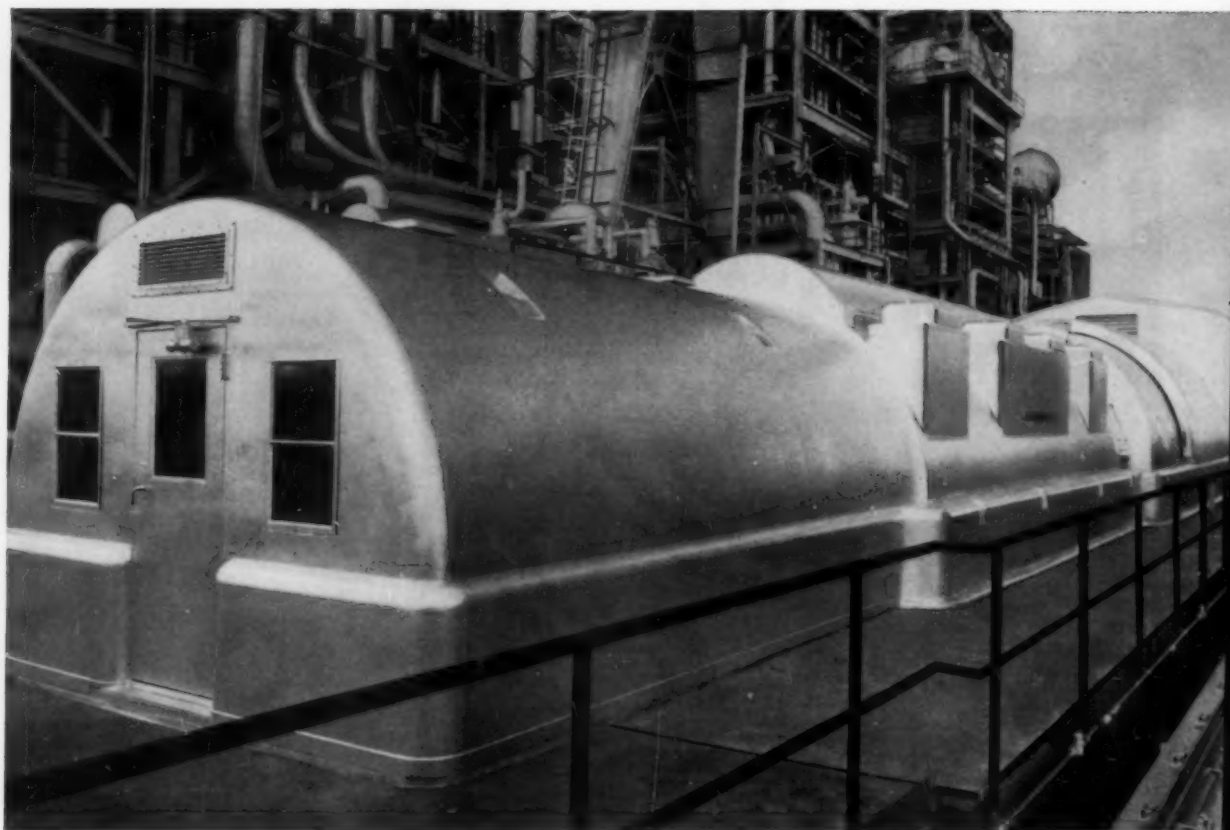
city _____

zone _____ state _____

The source of supply for all valve needs!

POWELL VALVES ...110th YEAR

BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.



Part of the 100-drum shipment of Gulfcrest Oil which will lubricate the new 150,000 kilowatt turbine. This brings the total output of the Cutler Plant to 370,000 kilowatts. All turbines are lubricated with the finest in turbine oils—Gulfcrest.

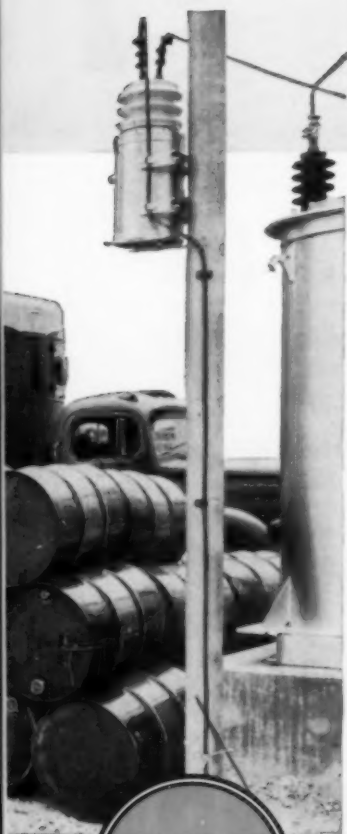


THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Past performance proved it best...

GULFCREST OIL

**selected to lubricate another big turbine
at Florida Power & Light Company**



When the Florida Power & Light Company recently installed the new 150,000 kilowatt General Electric turbine in its ultra-modern Cutler Plant, the choice of a lubricant was no problem. The outstanding past performance of Gulfcresc in the four other units in the plant made it a natural selection.

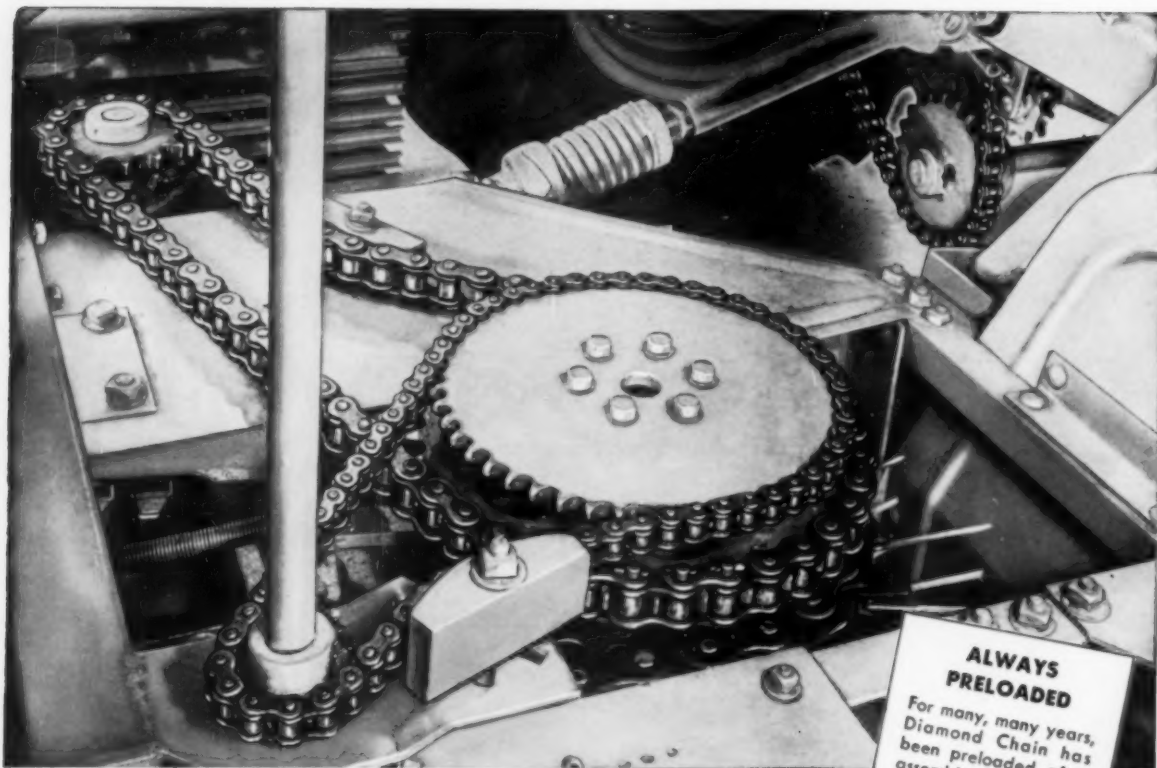
Gulfcresc Oil has a background of superior performance in other Florida Power & Light Company plants, and in scores of other prominent utilities throughout Gulf's marketing territory. Here's why:

Gulfcresc Oil is super-refined by Gulf's exclusive Alchlor Process, which removes the unstable hydrocarbons that remain after normal refining. This discarded portion, if allowed to remain in a turbine oil, accelerates oxidation, increases neutralization number, forms sludge and harmful acids.

So to insure safe, long-lasting protection for your turbines, specify Gulfcresc—the world's finest turbine oil.

Call a Gulf Sales Engineer today and have him recommend the proper grade of Gulfcresc Oil to meet the specific requirements of your turbines. Consult the telephone directory for the number of your nearest Gulf office.

GULF OIL CORPORATION • GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.



**ALWAYS
PRELOADED**

For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.

HOW ELSE CAN SEVERAL MOTIONS BE COORDINATED SO ECONOMICALLY?

Plant production engineers and executives, and machinery designers have found thousands of applications for Diamond Roller Chain during the past 65 years . . . They have found many times that results are accomplished that would be very difficult by any other means.

Performance is assured with economy in first cost and maintenance. High efficiency, long-life non-slipping operation and the universally recognized high uniform quality

continue to make Diamond Roller Chain first choice.

Our experienced engineering staff is ready at all times to make practical recommendations.


DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

Dept. 612, 402 Kentucky Avenue, Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



**Write for Catalog 754
Stock Roller Chains and
Sprockets**

Contents include:

- How to select Stock Roller Chain Drives
- Ready-to-use chain length tables.
- Table of speed ratios for sprocket combinations
- Sprocket selection tables for chains, all pitches
- Stainless Steel and Bronze chains

The Roller Chain
is DIAMOND

TRADE



MARK

STAYNEW

FILTERS

Dollinger makes ALL TYPES of filters as shown on this page, plus special filters for unusual filtration problems. New users of one specific type of Staynew filters often find a second Dollinger filter performs a great, added service in other processes or operations. Perhaps we can serve major or other filtration needs of your plant.

PIPE LINE FILTERS



Model CPH
Pipe Line Filter
Bulletin 200



Model CVH (Vacuum)
Pipe Line Filter
Bulletin 200



Model AAPHS
(Absorption)
Pipe Line Filter
Bulletin 200



Model HPH and AHPH
(High Pressure)
Pipe Line Filter
Bulletin 200

LIQUID FILTERS



Model HE (Sump)
Liquid Filter
Bulletin 330



Model ELS (Pressure)
Liquid Filter
Bulletin 300

all types of FILTERS for
every INDUSTRIAL NEED

AIR INTAKE FILTERS



Model IDR
(Ground Level)
Air Intake Filter
Bulletin 100



Model DS (Silencer)
Air Intake Filter
Bulletin 100



Model D (Outdoor)
Air Intake Filter
Bulletin 100



Model C (Indoor)
Air Intake Filter
Bulletin 100

VENTILATION FILTERS



Electro-Staynew
Mist Collector
Bulletin 420



Electro-Staynew
Precipitator
Bulletin 400



Automatic
Ventilation Filter
Bulletin 500



Dry and
Viscous Panel
Ventilation Filter
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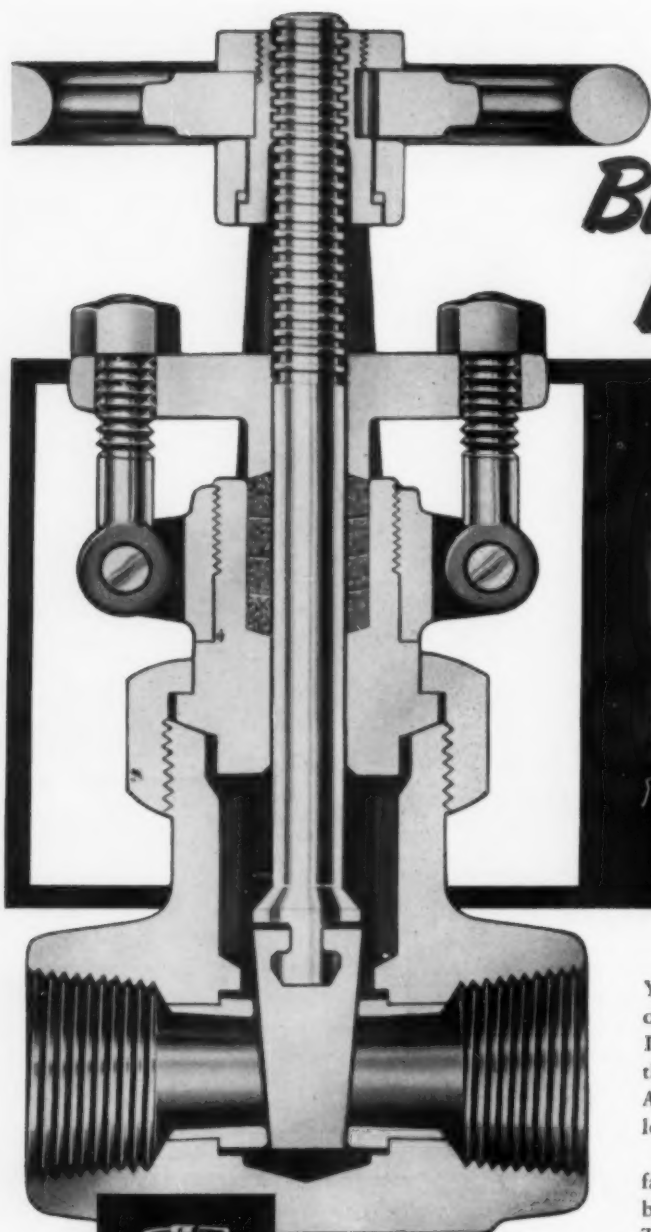
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SOUTHERN POWER & INDUSTRY for APRIL, 1956



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TIMELY COMMENTS

SOUTHERN POWER
AND INDUSTRY

"Char" Economical Fuel in West Virginia Plant

LAST MONTH excavation was started for the new \$60 million Kammer Power Station at Cresaps, West Virginia. Plant, being built by the Ohio Power Company (an American Gas & Electric Company subsidiary), will provide power for the Olin Mathieson Chemical Corporation's aluminum plant being constructed across the Ohio river.

The process to be utilized in preparing coal for the new Kammer Plant was highlighted in a recent report of the Public Utilities Association of the Virginias.

Pittsburgh Consolidation Coal Co. is investing \$20 million in a new mine and processing plant designed to remove the expensive chemicals from coal and produce a new fuel with all the heating ability of coal. They call the fuel "char" which has been undergoing experimental work in laboratories and pilot plants.

Conventional boilers would need only minor adjustments to use the char. Key unit in the big processing plant will be a steel tank called a charmaker. Pulverized coal will be blown into this vessel on a stream of flue gas derived from the charmaker. The swirling coal will be roasted at temperatures of about 900 F. The more volatile compounds will be boiled off in the gas stream and the char will drop down to be drawn off through a pipe at the bottom.

The process is expected to produce from 30 to 35 gallons of liquid hydrocarbons and about 1,500 lb of char from each 2,000 lb of coal.

The hydrocarbons can be broken down into carbon black, needed in the rubber industry; into plasticizers for plastics, rubber and paint; and high purity carbon electrodes, needed by the aluminum industry. Much of the product will be cresylic acids, which can be further processed into gasoline additives, agricultural chemicals, and ingredients for paints, varnishes and enamels.

Fluid Coke in Delaware

FLUID COKE will be used for fuel in the power plant of the new 130,000 barrel Delaware refinery of the Tide Water Associated Oil Com-

pany. Riley Stoker Corporation pulverizers will prepare the coke (by-product of the refining process) for burning in three Riley steam generating units. These will have a rated capacity of 500,000 lb/hr at temperatures of 950 F and at 1425 psig. Plant is expected to be on stream late in 1956.

Synthetic Fuel Comments

PRODUCTION of synthetic oil and gas will probably begin on a large scale within the next 10 years to supplement dwindling resources of natural gas and oil. Coal will be the main source for the synthetic fuels, and coal production must rise accordingly.

These are the main conclusions drawn in a discussion by two Battelle Memorial Institute engineers in a recent issue of Mechanical Engineering. Conclusions were based on estimates of population growth, per capita consumption of fuel, and fuel supplies.

According to the latest Census estimate the population of the United States will reach 210 million in 1975. Total energy demand in 1975 is expected to be 47% higher than in 1952.

Domestic crude oil production is expected to reach a peak by about 1965, but will decline thereafter. Import of crude oil may reach 2.3 million barrels by 1960, holding this level for a while, and then decline.

Production of natural gas, more difficult to estimate than the future supply of other fuels, may be double what it was in 1950 by 1975. The authors estimate that the reserve supplies in 1975 may be only ten times annual consumption.

Power from atomic energy will provide only an estimated 4.4 per cent of total power demand in 1975.

Solar energy, often seen as the ultimate source of power, requires much more technical development before it can contribute significantly to the total power supply.

"By any basis of consideration," the authors state, "it would appear necessary to have synthetic-fuel-from-coal plants before 1970."

Before 1975, they add, "either the use of natural gas must be curtailed, or supplementary gas must be brought into use based on synthesis from coal."

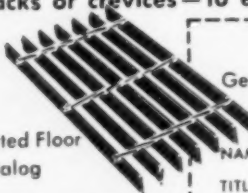


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Nuclear Power is Already a Big Industry

Meetings and Conventions

Reported by **JOHN F. LEE**

Southern Power & Industry's Consultant on Atomic

AT A RECENT meeting of the Investment Banking Association held at Hollywood, Florida, the nation's investment bankers took a hard look at the nuclear power industry and decided that activity in this field now warrants the title of "big business." According to Harlee Branch, Jr., who is chief executive of the Georgia Power Company and president of the Edison Electric Institute, investor-owned power companies have planned atomic power plants requiring a capital investment of \$225,000,000.

William S. Hughes of Wagenseller & Durst, Inc., a Los Angeles investment house, stated in a report to the meeting that 60,000 people are engaged in construction and 75,000 in operation of nuclear projects. Only 6,000 persons are working directly for the Atomic Energy Commission, making a grand total in excess of 140,000.

The Hughes' report warned that European nations are likely to steal the march on American firms in the world markets for nuclear power equipment. The report pointed out that Britain, because of the high cost of coal and oil in the British Isles, has the greatest incentive to exploit the possibility of economic nuclear power.

It was predicted that in the long run, Germany will take the lead because there is no diversion of effort to nuclear weapons. In fact, Hughes estimated that "Germany's investment in commercial reactors may well equal that of the United States and the United Kingdom by 1965."

Important Factors

The Hughes' report went on to call attention to four major factors which bear watching by American nuclear power interests. (1) Commercial advantages achieved by Britain and Germany in exporting nuclear reactors, (2) U. S.

Government policy in regard to its restriction on the participation of American firms in foreign nuclear projects, (3) U. S. Government policy on the adequacy of stockpiles of fissionable materials as it affects present nuclear projects and plans for future projects, (4) a possible early solution to the waste disposal problem and the problem of increased efficiency. The possibility of an early solution to the controlled release of nuclear energy by the fusion process merits careful watching.

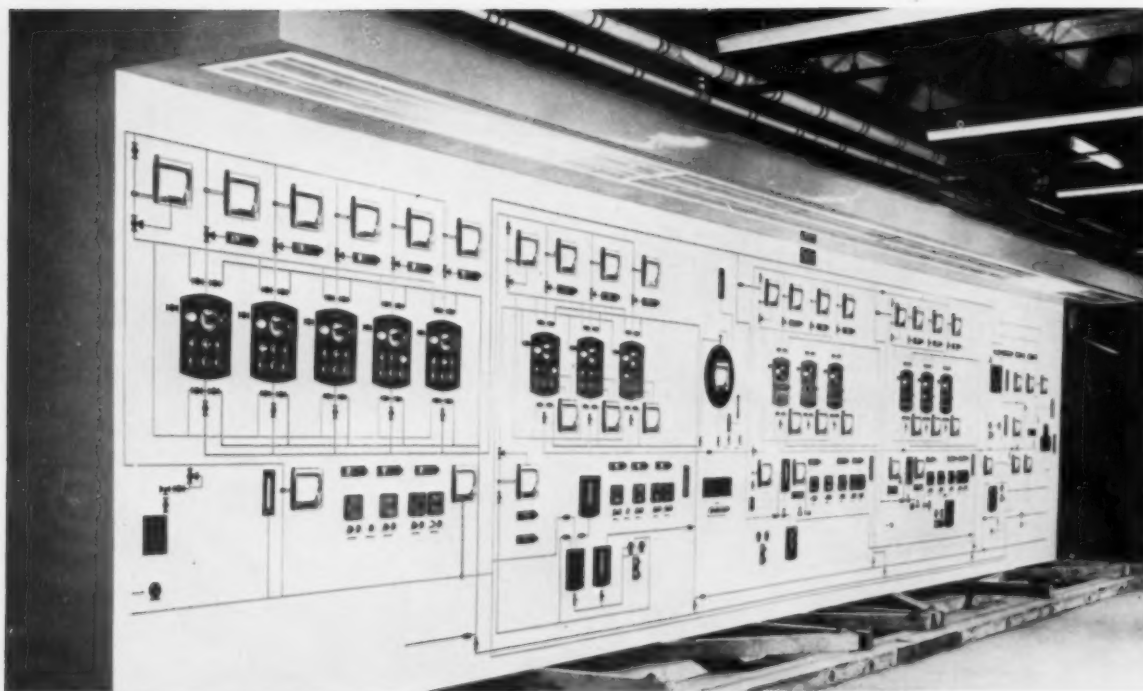
Mr. Branch predicted that the electric power industry would continue the trend of doubling its size every ten years. On this basis he estimated that the present generating capacity of 115,000,000 kilowatts will increase to 215,000,000 kilowatts by 1965 and 400,000,000 kilowatts by 1975. Construction costs should average about \$3,000,000,000 a year for the next ten years and will reach \$4,000,000,000 a year at the end of that period.

The Hughes' report estimated that nuclear power alone would involve a capital investment of \$250,000,000 and a generating capacity of 1,000,000 kilowatts by 1960. By 1975-80 nuclear generating capacity should reach 100,000,000 kilowatts according to the report.

Atomic Plant Wastes

One of the factors mentioned in the Hughes' report, the disposal of atomic power plant wastes, received considerable attention at the Nuclear Engineering and Science Congress held in Cleveland. Present practice calls for the disposal of radioactive waste products from nuclear reactors by burial in the earth or at sea. In a report given by E. I. Goodman and R. A. Brightsen of Nuclear Science and Engineering Corporation of Pittsburgh, they predict that by the year 2000 there will be 750,000,000 kilowatts of generating capacity in nuclear power plants in the United States alone. This generating capacity would produce about one ton of radioactive wastes per day. The world figure is likely to be three times as much. The report estimates that the long-life radioactive strontium, known as Strontium-90, present in radioactive waste can

(Continued on Page 70)



This graphic control panel for Monsanto's demineralization plant at Texas City is 33 feet long and 93 inches high. The lighted flow diagram is made up of appropriately colored plastic strips. The Formica panel front contributes to both appearance and ease of maintenance.

Water for Monsanto's Boilers — Texas City, Texas

Demineralization Automatically Controlled

THE SOURCE of water supply for the Monsanto power plant at Texas City, Texas, is the Brazos River, whose mineral content fluctuates from a low of approximately 200 ppm to as high as 1500 ppm.

An extensive treating system is necessary to provide water for boiler-feed makeup, to assure a high quality of steam at a minimum of boiler maintenance. The fully automatic demineralization plant selected was designed and built by the Belco Division of Bogue Electric Manufacturing Company.

The demineralization system consists of a battery of three Cation units, 10' - 0" diameter by 11' - 0" straight; three weak base Anion units, 10' - 0" diameter by

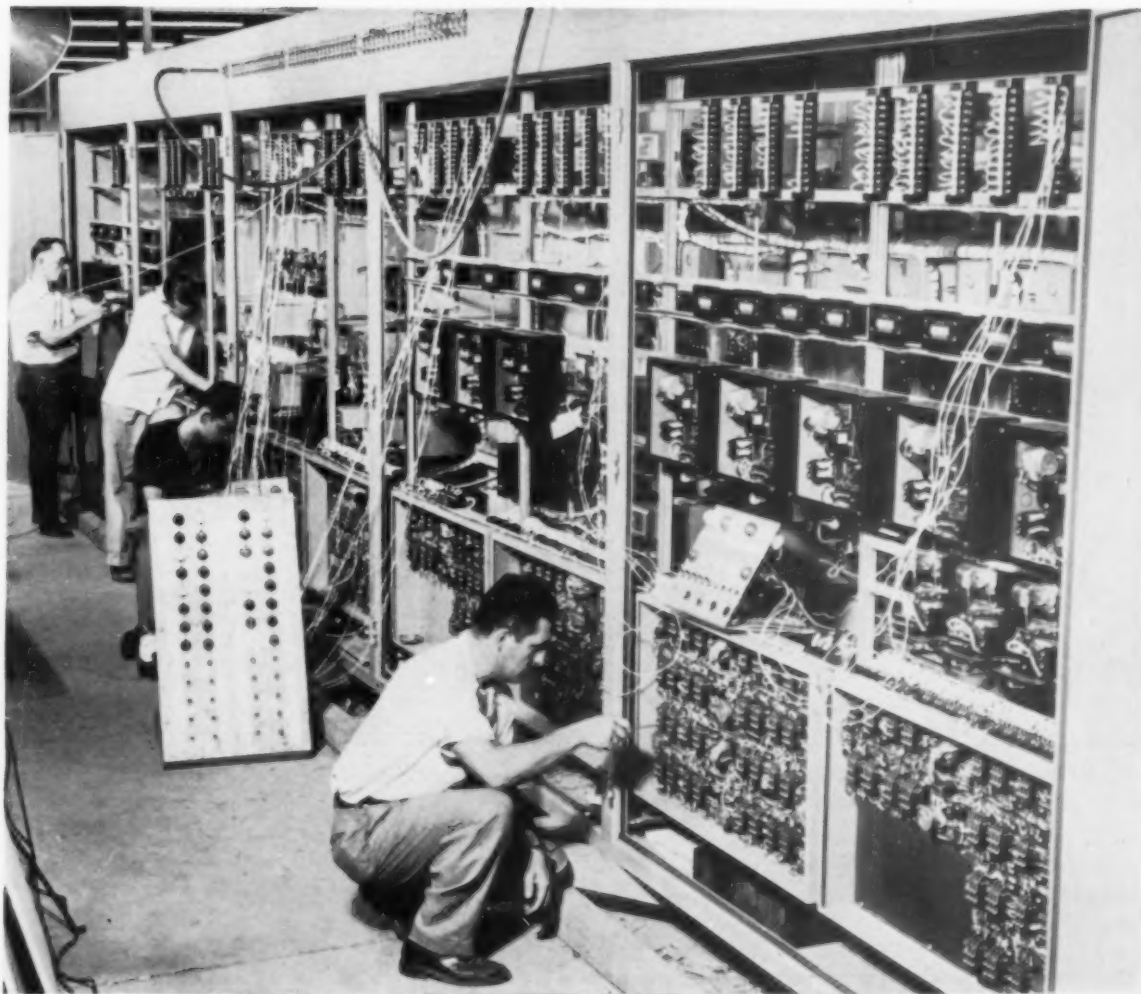
9' - 6" straight and three strong base Anion units, 10' - 0" diameter by 6' - 0" straight. The system is fully automatic in operation, incorporating a graphic type control panel board.

A Belco vacuum deaerator was included to reduce to a minimum, not only carbon dioxide (thus lessening the load and/or prolonging the service run of the strong base Anion exchangers), but also to remove oxygen in the Cation effluent so as to eliminate possibility of Anion resin deteriorating by oxidation. Further, the deaerated Anion effluent will not be corrosive, and use of lined pipes and special equipment to handle it will be not necessary.

The vacuum deaerator, a Belco

13' - 0" sphere design, was placed ahead of the Anion exchangers and mounted on a tower 130 ft high so as to provide gravity-flow of the deaerated Cation effluent to these Anion exchanger units. This eliminated the need for corrosion-resistant pumps to handle the Cation effluent.

There are five existing sodium zeolite semi-automatic exchangers presently installed at the Monsanto plant. These units have been re-designed by Belco for fully automatic operation and will furnish all water necessary for back-washing the weak and strong base Anion exchangers. The sodium softened water will also be used in providing the major portion of rinse water for the weak base



Complex controls were thoroughly checked and tested at the factory before shipment.

Anion exchangers, whereas Cation effluent will be used in the final rinsing operation of these Anion exchangers. It should be noted that in this installation influent water to the Cation exchangers will be taken directly from existing filters.

The Cation exchangers will be regenerated with hydrochloric acid, which is available at Monsanto. An arrangement is provided for recovery of a portion of the spent regenerant acid for use in succeeding regeneration of the Cation exchangers. Provision has also been made for using a portion of spent alkali regenerant from the strong base Anion exchangers to regenerate weak base Anion exchangers. Thus regenerant cost of the demineralization plant is re-

duced to a minimum without expense to the efficiency of regeneration.

This demineralization system will supply the equivalent of triple-distilled water to the boilers at Monsanto's power plant at a rate of one-half million pounds per hour.

The complete system was designed and engineered by Belco for the Texas City plant. The control panel stands 7 ft 9 in. high and is 33 ft long.

Designed for accessibility and easy inspection by the operator, the control panel shows at a glance the flow pattern in any portion of the demineralization plant by means of the lighted "flow diagram" made up of flat plastic

strips, each colored for a particular type of flow.

The front of the control panel is covered with Formica, another new idea in panel design adding to greater attractiveness and ease of maintenance, and an overhead canopy provides ample lighting over the entire panel.

The control panel board weighing approximately five tons, was completely designed, assembled, wired and tested at the factory, and shipped to Texas City by sea train. Only five months from the date of the order the finished panel board was shipped to Monsanto, although it ordinarily would take more than two years to engineer, build and ship a demineralization plant of this size and complexity.

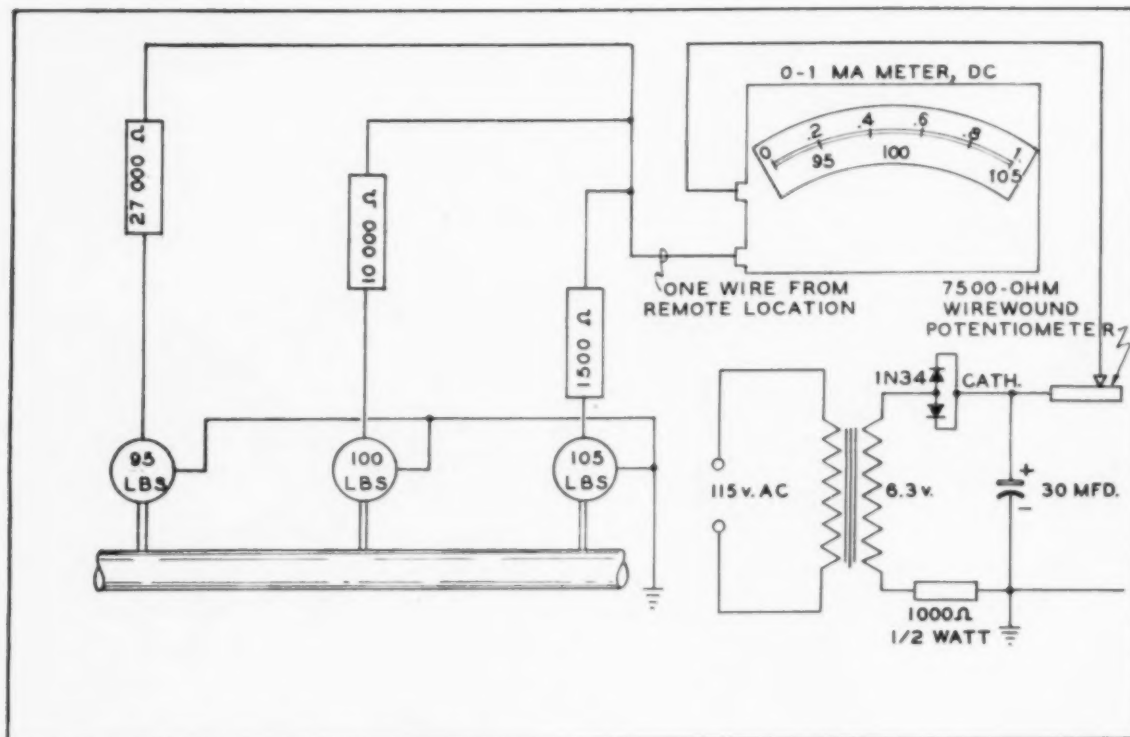


Fig. 1. This inexpensive telemetering system can be operated with a 6 volt battery or rectified a-c. The meter may be graduated in psi, etc.

Nearly Every Plant Has a Need for "distant vision"

INEXPENSIVE TELEMETERING SYSTEM

By RALPH R. TAGGS, E.E.

TELEMETERING is a necessity for large power plants as well as for many of the major industrial firms. Small plants usually must forego commercial installations because of the high initial expense which can not be handled out of limited maintenance budgets.

The writer observed recently what was dubbed a "poor man's telemetering system. It has been giving good service, and similar units have since been installed on several other remote applications.

The main 4½ in. meter is mounted on a panel and the small power supply is attached at the rear.

Power consumption is small and a regular 6-v dry-cell may be substituted for the rectification unit illustrated.

Selection of pressure switches at the reference points should be made with care in order to secure an adequate as well as close differential. In this particular installation operating over 2,000 ft of No. 20 telephone wire, the pressure switches are set at 95, 100, and 105 psi respectively (see Fig. 1). Steam pressure is nominally maintained at 100 psi.

When the pressure switches close, the resistor network in-

stantly transmits the pressure to the 1-ma d-c meter. A modified scale was developed by photography and pasted over the original instrument face. With 95 lb closing the first switch, the needle deflects to slightly over 0.2 ma, or ¼ scale. At 100 lb the meter reading is ½ scale (or 0.5 ma) and at 105 lb, it reads approximately ¾ scale.

This resistor combination gives a wide separation and standard 1-watt resistors can be used since commercial tolerances do not introduce any appreciable error. All resistors should be installed in a cool location, preferably in a moisture-proof cabinet a short distance from the pressure switches. Heat and moisture can appreciably alter

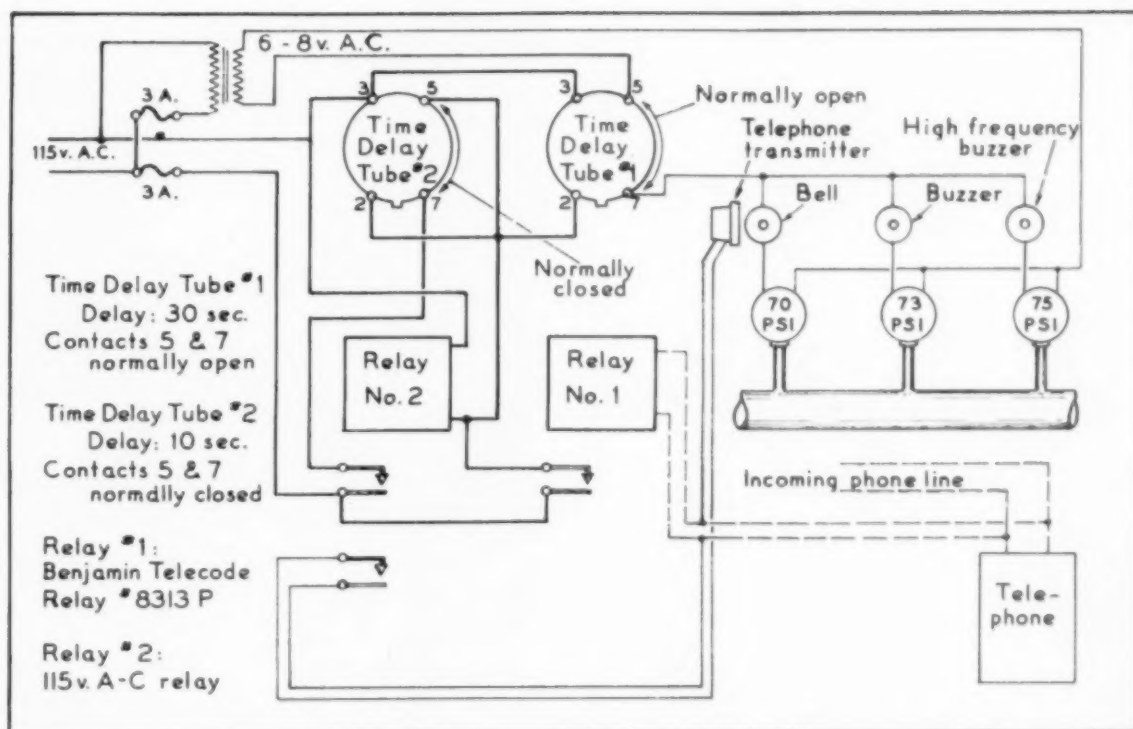


Fig. 2. This system provides audible reports of pressure or temperature by telephone from remote locations.

the values of resistors.

The 7,500-ohm wirewound potentiometer should be installed at the meter in order to adjust or calibrate for line resistance and keep the meter needle from maximum deflection and possibly damaging the unit.

While originally designed for a steam pressure application, companion units have been installed to telemeter pressure readings from the distribution system for water as well as low-pressure building heating and a number of temperature takeoffs. With suitable thermostatic switches it is possible to accurately read temperatures changes of plus or minus 2 deg remotely.

Signals by Telephone

An adaption of the telemetering circuit shown in Fig. 1 is illustrated in Fig. 2. This inexpensive system immediately signals pressure (or temp.) readings merely by dialing a telephone. Always available are audible checks of the three (or more) pressure switch ranges at any convenient telephone. Reservoir levels, pumping station pres-

ures, and even power plants (Diesel and hydroelectric) unattended at night can be checked to determine whether a desired value of pressure or other data is being maintained.

Relay No. 1 is a component part of regular loud-ringing telephone bells, and is available at electrical jobbers. It is the only part of the circuit permanently connected to a telephone system. The additional telephone transmitter provides a microphonic means to transmit the audible signals. The installation of a complete and separate telephone unit (set) is optional, since a single telephone circuit with an assigned exchange (or PAX) number will suffice.

Power is obtained from the nearest permanent service with one stepdown transformer. An inoperative sound signal will automatically show "power off" at the installation.

The thermostatic time-delay relay tubes mount in standard octal radio sockets and are available in nine different time spans from 5 seconds to 2 minutes. In this system, a ten-sec tube was used for

the first time pause to listen to the equipment; the other delay tube has a 30-sec time-delay and its purpose is to clear the robot from the telephone line.

In operation, a telephone ring momentarily closes relay No. 1 which electrically locks Relay No. 2. At the completion of the ring (about 1 sec), Relay No. 1 will drop out.

Closure of No. 2 energizes thermostatic elements between pins 2 and 3, and after 10 sec, delay tube No. 2 contacts will close, sending 6-8 volts to the three pressure switches. The signal will then sound from either the bell, buzzer, or high-frequency horn, depending on the pressure. After 30-sec time delay tube No. 1 opens contacts between 5 and 7, clearing the line.

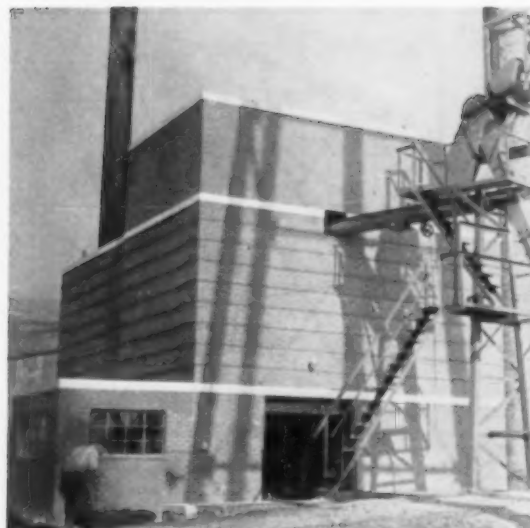
The thermostatic elements cool rapidly and the system automatically resets for the next call. With closely-set differential switches, accurate reports are possible with 6-in. changes in the water level in reservoirs. A drop in capacity will immediately indicate unusually heavy consumption or possible leaks.

At Wellford, South Carolina . . .

MODERN BOILER

Supplies

Steam for Textile Mill



View of boiler room, showing coal conveyor.

DURING the Fall of 1955 Jackson Mills, a textile manufacturing plant located at Wellford, S. C., installed a new boiler. As a result of expansion of the plant, the old boiler, which was installed in 1924, was no longer capable of producing enough steam for slashing and heating.

New Boiler

The new Babcock and Wilcox boiler is coal fired and stoker fed. It is a water tube boiler, having Bailey Meter Company controls

for the stoker, forced draft fan and stack draft damper.

The boiler has a capacity of 13,000 lb/hr, and is now operating at 5,000 lb/hr, allowing for future expansion, if needed. Steam pressure is maintained at 125 lb. Coal is conveyed from storage to a coal bunker holding 12 tons, allowing it to be filled once per 24 hours. The coal is from $\frac{1}{4}$ " to 2" nut coal and is carried by a flight conveyor to the coal bunker.

A Detroit Stoker feeds the coal into the boiler. Control charts re-

cord steam flow and steam pressure.

A new 126 foot high metal stack was installed. The stack is made of 3/16" sheet. The new stack provides better draft, lower installation costs and lower upkeep than the old brick stack which it replaced.

The feed water is regulated by Copes regulators, and all pipe is insulated and color coded, allowing for rapid identification of lines for maintenance.

The 27' x 37' building was constructed by Fiske-Carter Construction Company, Spartanburg, S. C., and the boiler was installed by Spartanburg Boiler Works.

The fireman checks the boiler once per hour and, with the automatic controls, has ample time to tend the main plant gate, and work in the leather shop adjacent to the boiler room.

Boiler front, showing stoker and controls.

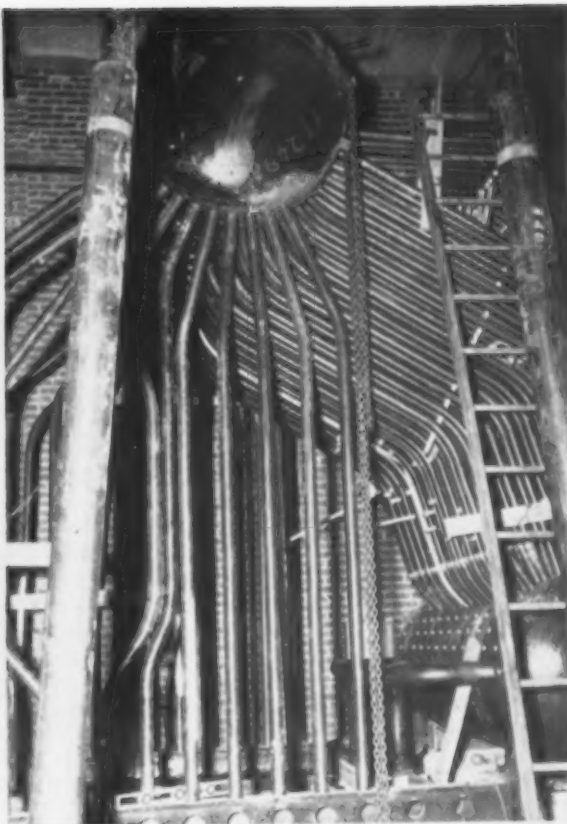
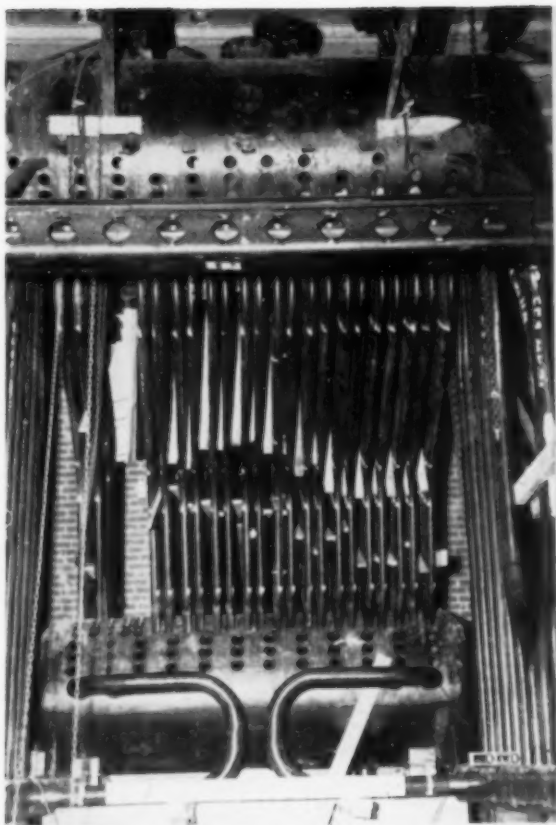


Upper left, front view showing installation of tubes in steam drum and mud drum.

Upper right, side view showing most of tubes installed.

Lower left, view showing boiler control panel.

Lower right, close-up view of stoker in operation.



Help Make Those Large Synchronous Motors Safe

By A. T. LOHKAMP, Engineer

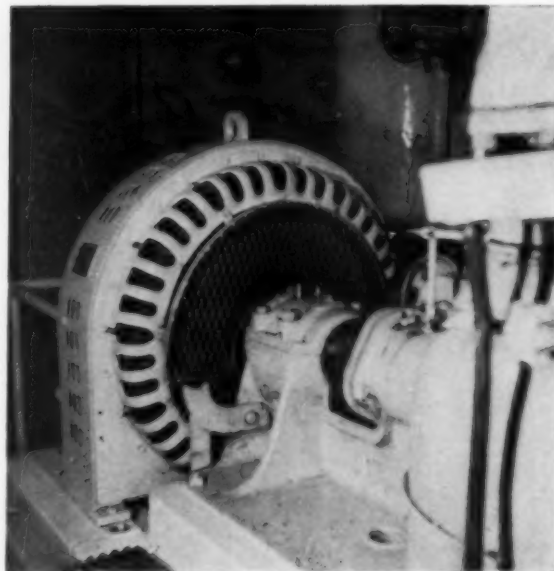
Pasco Packing Company
Dade City, Florida

PROVISION of adequate guards over couplings and rotating equipment should be one of the primary aims of power or refrigeration engineers. Accidents cost money in any plant and prevention of accidents is always justifiable from the humanitarian as well as the economical viewpoint.

Guards in the form of pipe rails, solid guards, or guards made of diamond mesh material are inexpensive and can be made to add to the plant appearance. The guards pictured are all easily removed and have helped make it possible to operate for four years without a lost time accident.

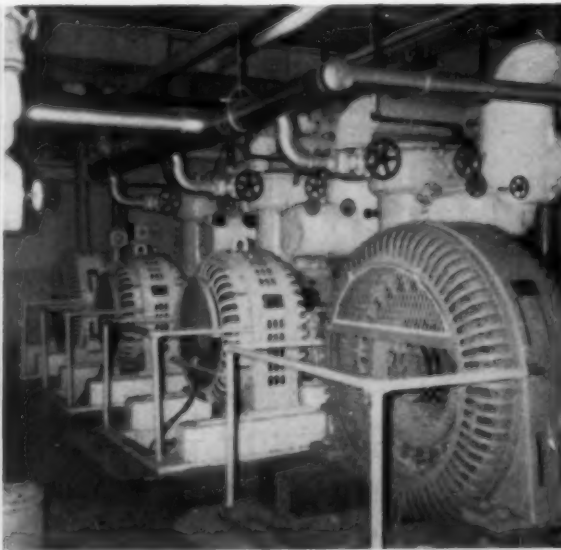
In addition to protecting employees, plant engineers must be ever careful to protect visitors. Public Relations Departments recognize the value of a friendly community, and more and more they are encouraging visitors, including school children, to visit industrial plants.

Two Ideal Electric & Mfg. Co. 100 hp synchronous motors protected by diamond mesh guards hinged at top of angle to provide easy access for brush and slip ring maintenance or repair. Easily removed entirely by removal of a few bolts.



Drive side of motors protected by diamond mesh shields to prevent injury to operators and visitors.

Four 100 hp Synchronous Motors with pipe rail guards to prevent stepping into pits or falling into motors while they are in operation. Center two motors are Westinghouse. Either end, Ideal Electric.



5,000 Feet of 60-Inch and 48-Inch Pipe

AN IMPORTANT engineering accomplishment in the State of Louisiana is the recently constructed Bayou Lafourche Pumping Plant project at Donaldsonville, La.

The plant, part of Louisiana's water resources development program, will help satisfy water requirements along Bayou Lafourche from the Mississippi River at Donaldsonville to the Gulf of Mexico. Water from the Mississippi River will be pumped into the Bayou Lafourche. The Bayou, an old distributary of the Mississippi, has been leveed off from the river since 1903.

More than 5,000 ft of 60-in. and 48-in. pipe, fabricated of wrought iron plate supplied by A. M. Byers Company, is employed in intake and discharge line service at the Bayou Lafourche Plant. The bulk of the plate used in the application ranges from 5/16-in. to 1/2-in. thick.

Four 470 ft, 60-in. O. D. pipe

lines are installed in intake service from the Mississippi to the pumping station at Donaldsonville; four 48-in. O. D. discharge lines, 840 ft long, are laid from the pumping station to the Bayou.

Leonard R. Kirst, design engineer for the Department of Public Works of the State of Louisiana, specified wrought iron for intake and discharge lines after investigation of the metal's service records and an analysis of the chemical content of Mississippi River water.

Factors influencing the selection of wrought iron for these large-size pipe lines included economic considerations, as well as the longer service life potential of the material. Wrought iron's known corrosion resistant properties per-

mitted construction of the lines without the additional cost requirements of special protective coatings and wrappings associated with other commonly used piping materials.

A portion of the large lines are supported above ground, with the remainder of the installations embedded below ground to depths of four to six feet. Sections of the discharge lines are installed beneath Louisiana State Highway No. 1 (one) a concrete road, and under the gravel surfaced streets of Donaldsonville.

Some of the intake lines were launched at the shipyard of Avondale Marine Ways, Incorporated, and floated to the site of installation.

Being launched into the Mississippi River (below) at the shipyard of Avondale Marine Ways, Incorporated, are four sections of corrosion resistant 60-inch wrought iron pipe. Pipe sections were floated to river end of the Bayou Lafourche Fresh Water District's Walter Lemann, Sr. Pumping Plant project and installed as intake lines (right).



Incineration of Industrial Solid Waste

By **JOHN C. MARKS, Chief Engineer**
Louisville Medical Center Power Plant
Louisville, Kentucky



Author

Chief Engineer, Louisville Medical Center Power Plant.

Air Pollution Consultant to Louisville and Jefferson County Board of Health.

Chairman, Committee on Air Pollution, Ky. 1 National Association of Power Engineers.

Former Assistant Chief Engineer, Air Pollution Control District, Jefferson County, Kentucky.

PLANT ENGINEERS are inheriting a growing problem today — that of the destruction or incineration of the waste material from plant operations. In the past many industries had land-fill projects to dispose of waste-products, but recent industrial expansion has made such operations impracticable.

Since incineration offers the only logical solution for waste disposal, industry is converting to this method. However the erection and operation of an incinerator cannot entirely solve the waste disposal problem, in fact it can create new problems, particularly in air-pollution, if it is poorly designed.

This article concerns one industrial plant which built and operated an incinerator only to find that it added to their problems due to poor and improper design. To overcome their problem they consented to experiment by making various changes in the incinerator. Before going into these changes let's consider some facts concerning incineration.

General Data

It is a surprising fact, but there is a serious lack of design parameters for today's industrial waste incinerators. You will not find the word *incinerator* in the index of many present day engineering handbooks, not to mention the lack of engineering material on incineration in them. Many groups are, however, beginning to explore and study through extensive tests what can be done to set up basic design features which will lead to better waste disposal.

Principally incinerator design should:

(1) Provide maximum combustion efficiency to insure complete destruction of the combustible contained in the waste material.

(2) Hold to a minimum the emissions of odors, smokes, fumes and solids.

(3) Provide maximum reduction in the volume of the waste.

(4) Have an interior configuration to reduce entrainment of solids, allow good mixing of gases and be conducive to long flame travel.

(5) Provide proper amount of air, introduced at best possible locations to insure turbulence and good combustion.

(6) Introduction of an auxiliary fuel if and when needed.

There are numerous ways to accomplish these aims. To date, our basic approach has been through knowledge obtained in the burning of other fuels, i.e. coal, oil and gas. However, this approach offers limitations.

The major problem confronting us in establishing design standards is that waste fuel is very inconsistent in its composition and complex in its chemical makeup. Therefore to arrive at a basis of design, we must first determine what type of waste we want to destroy — solid, gaseous or liquid. We must further determine what percentages of combustible ash and moisture the waste will contain.

Once the incinerator is designed and put into operation we must adhere, within reasonable limits, to the waste that it was designed

to destroy and not expect it to dispose of everything that may come its way. There is not much flexibility in an incinerator unless physical changes are made in it.

This article is limited to the destruction of solid waste containing not over 10% garbage as outlined in Table 1.

It has been fairly well established that multiple-chamber incinerators offer the best potential for the destruction of solid waste material over the widest range of conditions.¹

CASE STUDY

The American Air Filter Company, Louisville, Kentucky had a structurally sound incinerator, however they were confronted with two problems, both perplexing.

(1) Compliance with local air pollution codes.

(2) Poor reduction of the waste material.

The incinerator was originally

designed to burn 800 pounds of solid waste per hour. Figure 1 shows the original design features which reveal some important reasons for its malfunction.

In analyzing some of the design ills we arrived at the following:

(1) Extremely large furnace volume which would require very high furnace temperatures to bring the refractory up to temperature needed to sustain good combustion.

(2) Poorly constructed settling chamber — in that it was smaller than the adjoining combustion chamber, producing high velocities which would entrain solids carrying them out the stack. The expansion of the gas stream is vital (without the provision of a collector) if solids are to be dropped out in the settling chamber.

(3) The firing door which was quite large (16 sq ft in area) was hinged from both sides causing slow operation which allowed large amounts of cool air to enter with each charge, cooling the combustion chamber.

(4) The stack was connected to the base of the settling chamber, thus allowing reentrainment of trapped solids at high burning rates.

(5) Lack of interior configuration to establish long flame and gas travel and to produce some mixing of the gas stream.

(6) No provision for over-fire air.

These six points cover most of the important phases from which to establish design changes. We must remember that the changes cannot be too radical or the incinerator will have to be completely rebuilt. It is wise when redesigning an existing installation to make changes with the least possible destruction of the original design in order to hold investment costs low.

We first began our changes by moving the bridgewall ahead 2 feet. We then hung a drop curtain 1 foot behind the bridgewall followed by a secondary bridgewall ahead of the settling chamber. To provide a source of secondary air we removed four bricks from the setting on each side. We later found that the fourth port was too late to introduce secondary air mainly due to the temperature drop at this point. It was felt that if sufficient pressure differential was obtained between the atmos-

TABLE 1 — CHARACTERISTICS OF WASTE BURNED DURING TESTS

Typical Fuel Composition

Dry Rubbish—65%, Wood—15%, Garbage—10%, Sawdust—5%, Rubber—5%.

Properties of Waste Based on Today's Test Data

Waste	Combustible	Moisture	Ash	Btu as Fired
Dry Rubbish	80%	7%	13%	7,400
Wood	80	15-20	1	8,000
Garbage	20	75	5	1,600
Sawdust	75	20	5	6,750
Rubber	100	0	0	13,000

Contribution of Various Fuels Fed During Tests

Waste	Combustible	Moisture	Ash	Btu as Fired
Rubber	5%	0%	0%	650
Wood	12	3	.15	1,200
Dry Rubbish	52	4.5	8.45	4,610
Garbage	2	7.5	.5	160
Sawdust	3.75	1	.25	337
Totals	74.75	16.0	9.35	6,957

From the above data the average heat value per pound is assumed at 7,000 Btu.

phere and the combustion chamber a natural draft effect would provide adequate over-fire air.

As you can see in Figure 2, we now had essentially a multiple-chamber incinerator.

Theoretically these changes gave us the following:

(1) We provided six changes in direction for the gas stream which would accomplish better retention of the solids and mixing of the gases.

(2) The increased refractory surface would radiate more heat to the fuel bed and gas stream, producing longer flame travel and more complete combustion to reduce odors.

(3) Provided a supply of secondary air.

(4) Allowed for expansion of the gas stream in the settling chamber.

First Test

The first test after the changes was a purely visual one using the waste material outlined in Table 1. This waste fuel mixture was established from an investigation of the waste products from this plant. I might add that this mixture could be considered fairly representative for many industrial plants. However a waste investigation of your particular plant will be of great value in setting up design standards and features whether you plan to build your own incinerator or have one of the incinerator companies erect one for you.

Visual observations indicated a definite improvement had been made. However, we found that the increased baffling with its ac-

companying draft losses created pulsations and positive pressures within the incinerator and the charging door still presented the effect of too much cool air entering the combustion chamber during the charging period.

We found that as we progressively opened the over-fire air ports (which were provided with sliding panels) the smoke became progressively lighter. Flame travel which previously had been very short (ending in the initial combustion chamber) was now established to a point just past the secondary bridgewall.

To overcome the positive pressures and the cooling efforts we added 12 more feet of stack height (making it 38 feet high) and installed an air-operated guillotine type charging door.

On the next visual test, 500 pounds of oily waste socks from Diesel locomotives were charged. The deviation in waste fuel was to determine the smoke reducing qualities of the over-fire ports.

Temperature checks through the combustion chamber revealed an average temperature of 1800 F. The 500 pounds of socks were completely destroyed in 45 minutes with only 4 minutes of violating smoke, i.e., above a No. 2 Ringleman. The increase in stack height eliminated positive pressures and pulsations.

It was found on this test that the fourth port being open or closed did not affect the smoke density or combustion process and

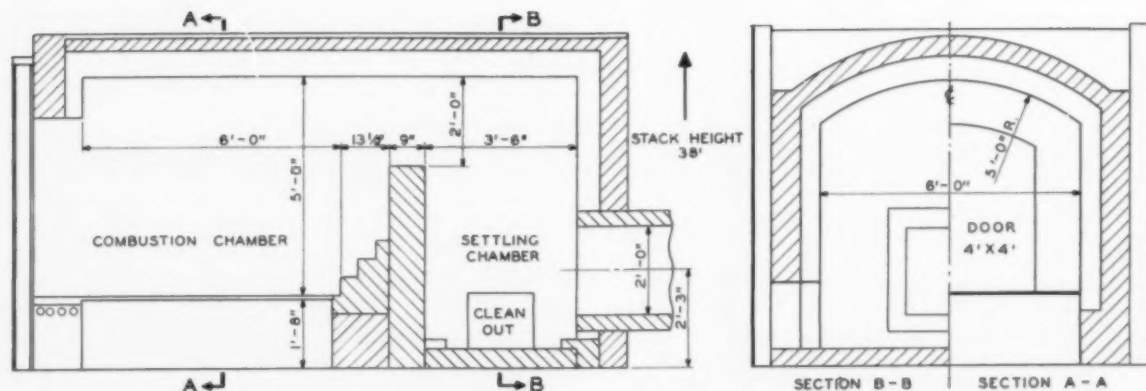


Fig. 1. Original design features of incinerator before tests.

for that reason it was sealed off. The ash pit door was opened slightly during the test to permit some primary air to enter. I might add at this point that if you expect to experience temperatures above 1600 F you should select your refractory, carefully noting its slagging temperature or maintenance cost will run high.

More Elaborate Tests

More elaborate test procedures were then set up to determine the effects of the changes on such things as furnace temperature, velocity, smoke emission and general combustion efficiency. We were particularly interested in the effects of the over-fire air ports opened and closed on the above points.

In this test the waste mixture in Table 1 was used during the test. Each charge of fuel was weighed prior to firing in order

to calculate burning rates and heat releases. No attempt was made to charge the same amount of fuel each time, but rather allow the nature and size of the fuel being charged to govern the amount. In this way we would be testing under near normal operating conditions rather than setting up ideal testing conditions. No stack dust loading tests were made since they were beyond the scope of this particular test.

Figure 3 shows the location of the test points and in each case they were located along the center axis of the incinerator. All Orsat analysis were taken in the breeching near the base of the stack.

Test Results

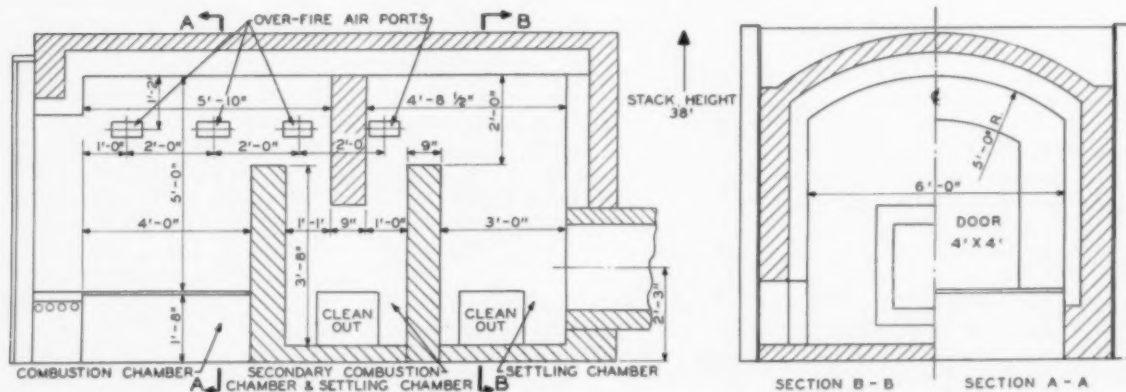
Table 2 shows the results of the tests, both of which were conducted on the same day. To establish some type of sampling pattern we attempted to sample 5 minutes

after each charge. Smoke density was recorded continuously throughout the entire test periods.

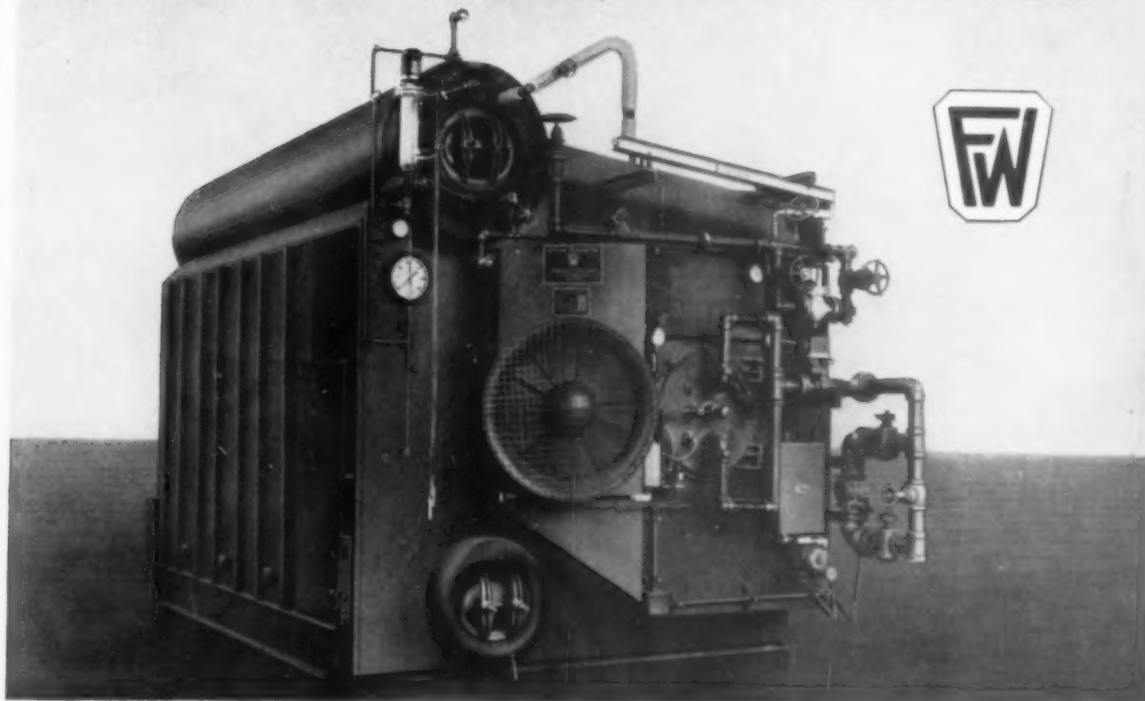
One very prominent thing that may surprise you if you are not too familiar with Orsat results from incinerators is the large deviation of readings from those encountered in normal boiler tests. First let us realize that we are not too concerned with thermal efficiencies but rather in good and complete destruction of the waste fuel.

Efficiency is only of importance when we attempt to utilize the waste heat, and even then we cannot expect thermal efficiencies to approach those of conventional boilers due to the extreme fluctuation in fuel consistency. Excess air will generally run considerably higher to insure adequate oxygen to mix with the fuel than we experience in boiler practice. CO₂ as in boiler practice is our guide

Fig. 2. Design features after changes were made.

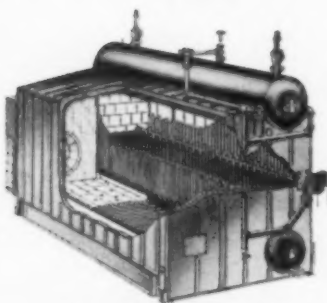


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to the amount of excess air being supplied and we should attempt to keep CO₂ high as possible without obtaining appreciable CO.

The test results showed considerable CO in the gas stream which stemmed from several factors. First of these was stratification of the gas stream; second, poor mixing of the secondary air with the gases being driven off the fuel bed; third, temperatures in some parts of the fuel bed were too low to allow proper volatilization of the gases and also we must remember that we are working with very thick fuel beds which results in thick ignition zones creating a definite need for good mixing and turbulence.

At this point we felt that if the secondary air were supplied with an auxiliary blower we could

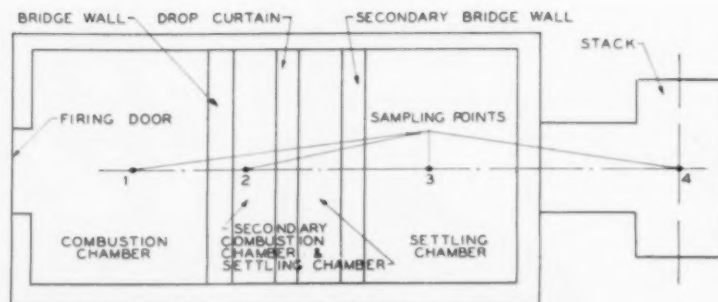


Fig. 3. Location of test points. Point 1: temperature, draft. Point 2: velocity. Point 3: velocity. Point 4: Orsat analysis, temperature, draft.

eliminate the CO by better mixing and greater turbulence. However, in spite of the presence of CO we felt that general combustion results were satisfactory.

The faulty secondary supply was borne out by the fact that

penetration relying on natural draft was approximately 14 inches in on each side of the combustion chamber leaving four feet without a source of supply, not to mention a lack of turbulence. Some mixing of the gases was accomplished

TABLE 2 — INCINERATOR TESTS WITH PORTS CLOSED AND PORTS OPEN

Location 1 — Behind Bridge Wall						Location 2 — Settling Chamber							
Time	Location	Velocity ft./sec.	Temperature °F Furn. Stack	Draft " Water Furn. Stack	Ringleman Density	Mins. of Burning rate	Heat release Btu/cu. ft./hr.	CO ₂	Orsat CO	O ₂			
Test No. 1, with Ports Closed:													
10:05A	1	14.2	730	400	.12	.21	2	10	37.5	43,700	0	18.4	1.4
"	2	8.5	"	"	"	"	(150 pounds of fuel fed at 10:00 A.M. burned down at 10:10 A.M.)						
(Preparing fuel charge for next test period)													
10:40	1	19.3	1320	650	.14	.28	1	15	33.3	38,888	1.8	12.2	4.2
"	2	9.6	"	"	"	"	(200 pounds fuel fed at 10:25 A.M. burned down at 10:50 A.M.)						
10:45	1	14.9	850	550	.14	.25	"	"	"	"	1.0	14.2	4.8
"	2	"	"	"	"	"	"	"	"	"	"	"	"
11:05	1	12.2	1340	650	.14	.27	3	2	29.1	34,000	1.0	14.8	4.2
"	2	9.6	"	"	"	"	2	5	"	"	"	"	"
8 (175 pounds fuel fed 11:00 A.M. burned down at 11:15 A)													
Test No. 2, with Ports Open:													
12:05P	1	17.2	1300	450	.05	.24	1	10	35.0	40,833	4.2	2.4	13.4
"	2	12.3	"	"	"	"	(210 pounds of fuel fed at 12 Noon burned down at 12:15P)						
12:20	1	16.7	1200	415	.05	.25	3	5	21.0	24,500	2.0	3.6	12.2
"	2	10.5	"	"	"	"	1	5	(126 pounds fuel fed at 12:15 burned down at 12:30)	"	"	"	"
12:35	1	21.2	1820	650	.06	.23	2	5	55.0	64,167	0.0	3.0	13.0
"	2	13.68	"	"	"	"	(220 pounds fuel fed at 12:30 burned down at 12:40)						
12:45	1	19.35	1750	550	.06	.22	1	3	30.0	35,000	1.2	2.8	12.0
"	2	13.0	"	"	"	"	(60 pounds fuel fed at 12:40 burned down at 12:47P)						
12:50	1	18.4	1620	575	.05	.21	(No smoke)		27.5	32,083	1.6	4.4	12.4
"	2	11.4	"	"	"	"	(165 pounds fuel fed at 12:47 burned down at 1:03)						

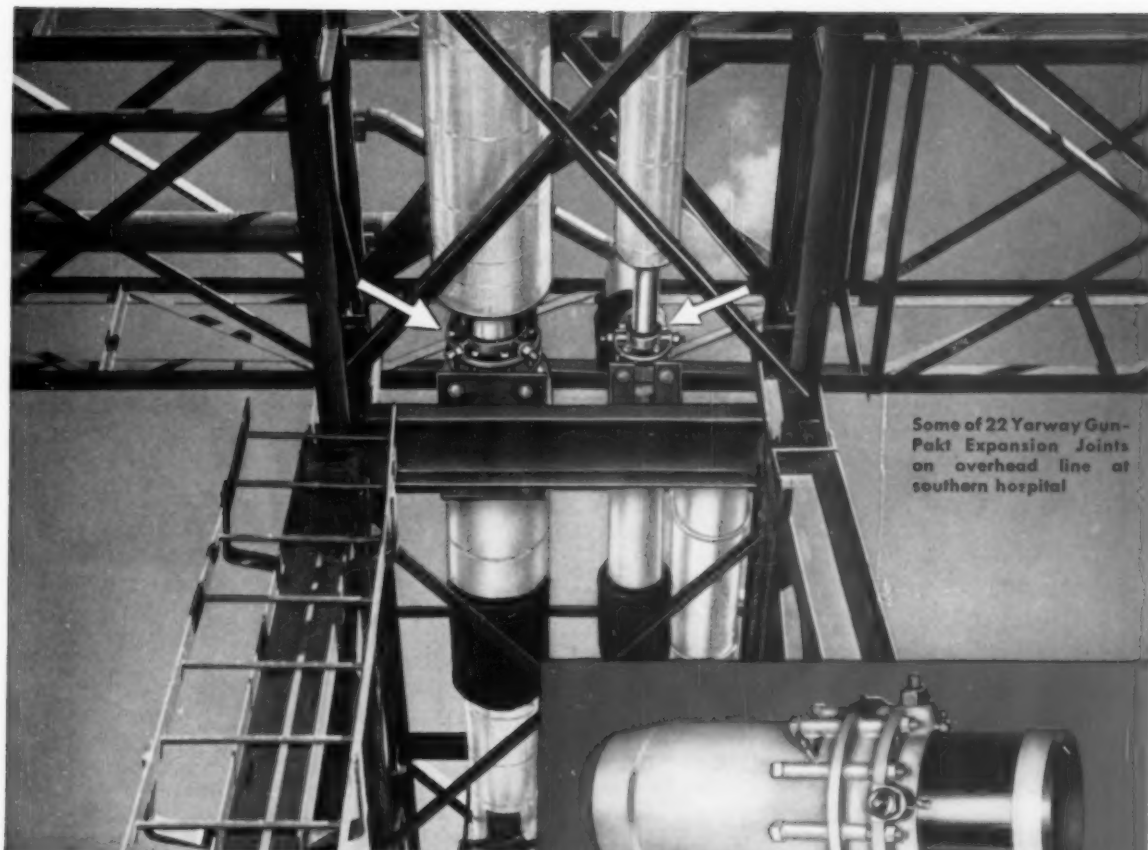
AVERAGES — TEST NO. 1

Average velocity point 1 = 15.1 feet/sec.
 Average settling chamber velocity (point 2) = 10.1
 Average furnace temperature = 1060 F.
 Average stack temperature = 562 F.
 Average % CO₂ = 0.95, CO = 3.65, O₂ = 14.90
 Violated 62% of operating time.
 Total operating time 40 minutes.
 Average furnace draft = 0.135 inches water.
 Average stack draft = 0.252 inches water.
 Average burning rate = 33.3 lbs/sq ft/hr.
 Average heat release = 36,196 Btu/cu ft/hr.
 Number of minutes violating smoke density = 17 mins.
 Average smoke density # Ringleman = 1.47
 Average draft differential = 0.117 inches water.

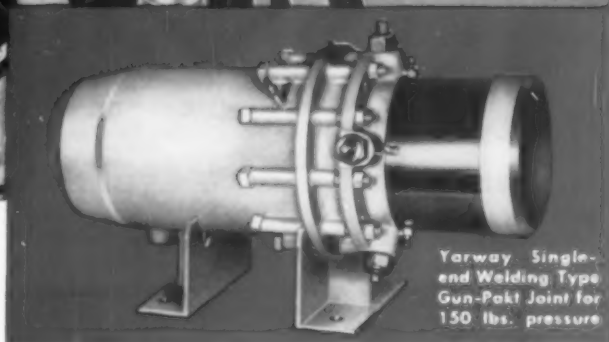
AVERAGES — TEST NO. 2

Average velocity behind bridgewall = 18.57 feet per second.
 Average velocity in settling chamber = 12.17 feet per second.
 Average furnace temperature = 1538 F.
 Average stack temperature = 528 F.
 Average Orsat analysis results = CO₂ = 1.8, CO = 3.21, O₂ = 12.60.
 Average furnace draft = 0.054 inches water.
 Average stack draft = 0.23 inches water.
 Average burning rate = 33.7 lbs/sq ft/hr.
 Average heat release = 39,316 Btu/cu ft/hr.

In calculating settling chamber velocities stack temperatures were used. Furnace temperatures were used for bridgewall vel.



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TABLE 3 — HEAT VALUES AND EXCESS AIR

Substance	High-heat Value Btu/lb maf waste	Theoretical Air Needed for Complete Combustion lbs air/lb maf waste
Paper	7900	5.9
Wood	8400	6.3
Leaves and grass	8600	6.5
Rags, wool, cotton	8900, 7200 respectively	6.7, 5.4 respectively
Garbage	7300	5.5
Rubber	12,500	9.4
Suet	16,200	12.1

maf means moisture-ash free, where ash refers to total in combustible material.

Values for high-heat Btu are necessarily approximate since the ultimate composition of the combustible part of the materials will vary somewhat depending upon their sources. The heating value of the as-received material is obtained by multiplying the maf Btu by 100 — (percentage moisture and ash)/100. For example garbage containing 35 percent moisture and 5 percent ash or other incombustible material will have an as-fired heating value of 4380 Btu per pound.

Values for theoretical air are also approximate and are based upon 0.75 lb air per 1000 Btu for complete combustion. For various percentages of excess air, multiply these values by $(100 + \text{percent excess air}/100)$. For example, if paper is burned with 100 percent excess air, $(5.9)200/100 = 11.8$ lb air per lb of maf paper will be required.

later as the stream changed direction but was too late to be very effective in reducing CO.

Table 3² gives the theoretical air requirements for various waste fuels based on their moisture-ash free heat values. Using the value of 0.75 lb air per 1,000 Btu our fuel mixture of 7,000 Btu/lb would require 5.25 lb air per lb fuel.

From the average Orsat analysis with the ports closed we had approximately 160% excess air based on the formula:

Excess air =

$$O_2 - \frac{1}{2} CO$$

$$0.264 N_2 - (O_2 - \frac{1}{2} CO)$$

We can expect this formula to give us results accurate enough in incinerator practice when using solid waste fuels nearly identical with those outlined in this article.

With the ports opened excess air average 102%. Many present day incinerators operate satisfactorily with 200 to 300% excess air depending on the type of fuel and method of firing. Excess air should be held to a minimum to obtain temperatures consistent with good combustion practices and hold velocities down to a point where entrainment will pose no problem.

At this point, I would like to explain the reason for the differences in excess air since we might expect that excess air would increase with the ports open. In

conducting the tests with the ports closed, the ash pit doors were approximately half way open which was conducive to large amounts of air passing through the fuel bed at high velocities.

This condition could not be adequately controlled by positioning the ash pit doors and resulted in a high amount of excess air. With the ports opened we adjusted the ash pit doors to a point where they were nearly closed thereby decreasing the amount of primary air entering under the fuel bed and reducing velocities through the ignition zone.

Our major supply of air then came from the ports, establishing more surface combustion. And with the sliding panels we had better control over the amount of air entering as the fuel bed burned down. This resulted in less excess air. Another fact noted with the ports open was the decrease in furnace draft to 0.05 inches water which would improve temperature conditions.

Another important factor to consider in the design of solid waste incinerators is the velocities through the system. Several things contribute to velocity: the size of the combustion chamber and settling chamber, burning rates, locations of bridgewalls and other obstructions, and temperatures.

From data obtained in the test we found the average velocity in

the settling chamber was approximately 12 ft/sec which is considered by many authorities ideal. A velocity this low will not entrain large particles and emit them from the stack, a condition quite common to many incinerators and a major complaint against them. No visible emissions of any kind were noticed during either test with the exception of smoke.

Burning rates and heat releases were nearly identical in both tests averaging approximately 33.5 lb/sq ft/hr and 38,000 Btu/cu ft/hr respectively. From data accumulated in the tests it would be safe to assume that the incinerator could dispose of 720 lb/hr using the type of waste in Table 1.

If waste material contains over 10% garbage it is advisable to install an auxiliary fuel burner to maintain high temperatures. There is some question regarding where such auxiliary fuel should be introduced, but most authorities agree on the initial combustion chamber.

Furnace temperatures on the second test averaged 1538 F which is near ideal for incinerator operation. If temperatures in the combustion chamber remain consistently above 1200 F no odor problem should arise. Most unpleasant odors stem mainly from fatty acids which tend to break down around 850 F. Hydrogen also in refuse ignites about 1100 F, carbon monoxide and methane at 1200 F.

A definite improvement can be seen in the smoke emission with the ports open. The violating time for the test number 1 was 62% as compared to 16% during test number 2 with the ports open. The average smoke density during test 2 was 0.7 Ringleman.

Summary

The design changes effected decided improvements although more is to be desired. One important design feature that could not be incorporated was the grate ratio (length to width). This ratio should be approximately 1.5 to 1, however our changes were limited for reasons explained earlier.

The introduction of over-fire air helped considerably to reduce

(Continued on Page 60)

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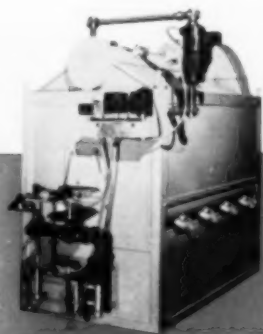


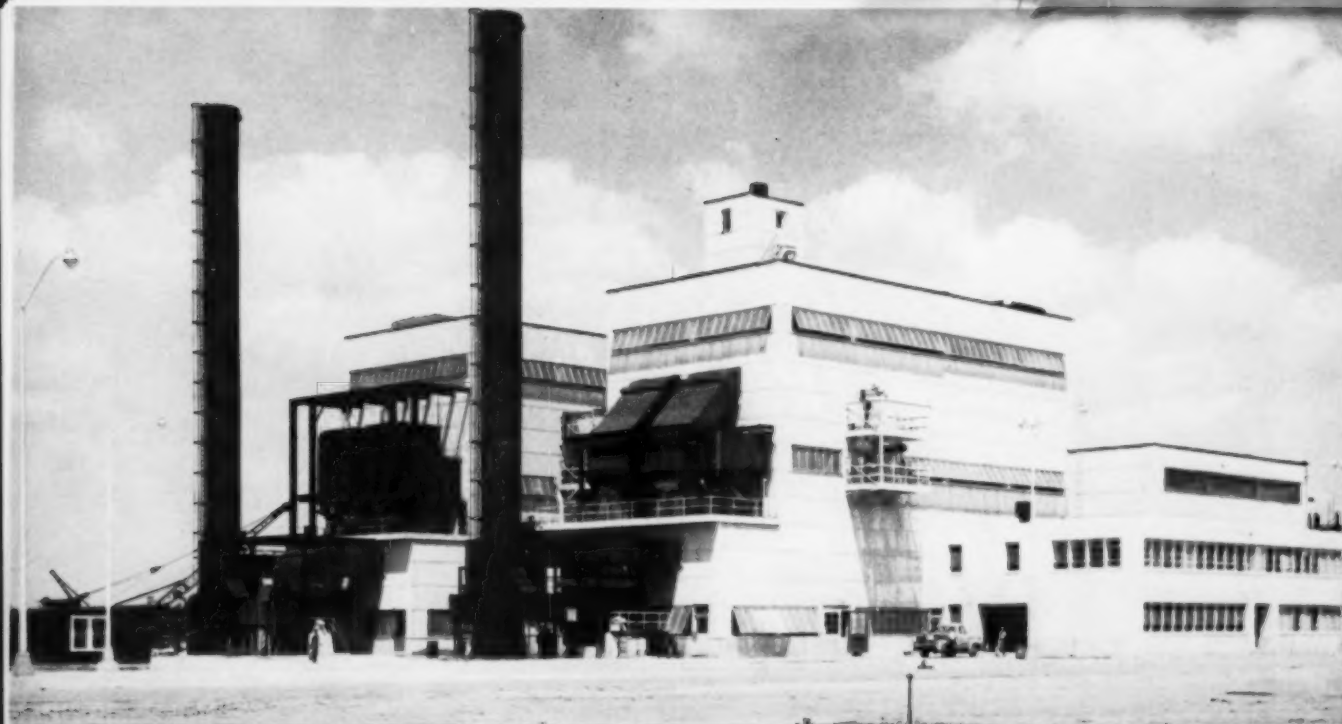
Illustration shows packaged small gas-fired boiler ready for immediate shipment from stock.



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Avon Park Plant

In answer to increasing industrial, commercial and residential demands for electrical power, Florida Power Corporation began an extensive long range program for expansion in 1950.

Their first project was the remodeling and enlarging of their existing Steam Generating plant located on Lake Lotela, a half mile from Avon Park, Florida. As part of the modernization of this plant, they removed the old siding and steel sash windows and planned to replace them with material requiring less maintenance.

Their own engineering department and their consulting engineers, Burns and Roe of New York, sought a new window material to provide good daylight with minimum maintenance. The new material had to be adaptable to the new Unit No. 2 to be constructed as well as to the existing Unit No. 1.

This problem was answered by specifying and installing Pennsylvania Corrugated Wire Glass aluminum windows and corrugated asbestos siding. Sidewall construction of Pennsylvania Corrugated Wire Glass is a complete unit of glass and sheet metal parts which can be attached to the superstructure of any building.

Suwannee River Plant

(Units 1 and 2 Illustrated)

In 1953 the first completely new steam generating plant in this expansion program of the Florida Power Corporation was constructed at Ellaville, Florida, on the banks of the historic Suwannee

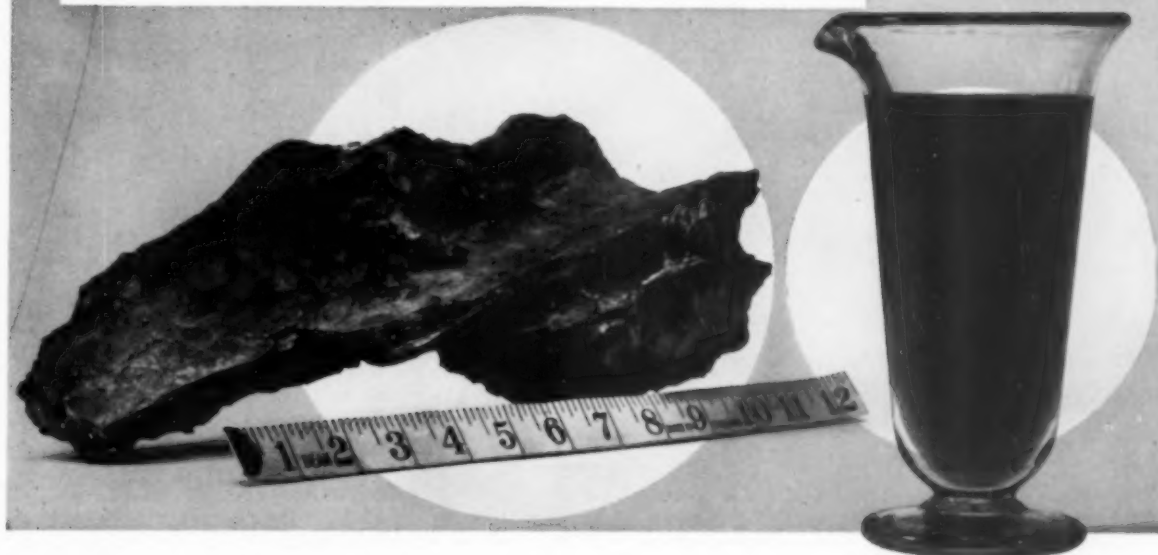
River. Again the same wall and window construction was specified by their consulting engineers, Black and Veatch, Kansas City, Missouri, for the Suwannee Plant.

Wire glass windows were first installed in the temporary west wall of Unit No. 1. Later these windows were moved to the west wall of Unit No. 2 without loss of production during expansion of the building, proving another unusual advantage of corrugated wire glass . . . it can be economically moved and reused.

Turner Plant

The previous experience of the Florida Power Corporation proved that production efficiency is closely geared to the abundance of well diffused natural daylight. When construction of Unit No. 3 of the Turner Generating Plant, located on Lake Monroe at Enterprise, Florida (near Sanford), was started in March, 1954, wire glass aluminum windows were again specified.

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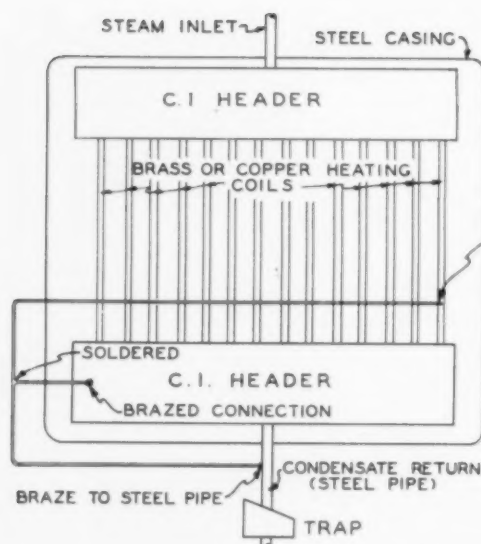


Fig. 1. Unit heater with copper wire installed as recommended in the article.

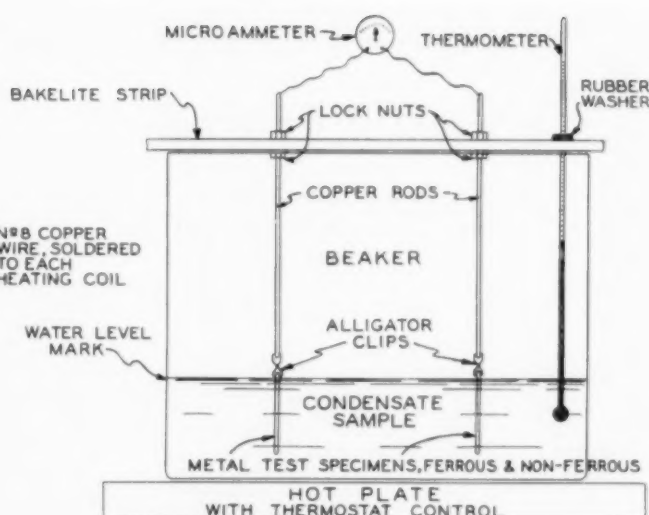


Fig. 2. Simple device for testing condensate and samples of metals. Test at same temperature as condensate in heater.

Defeat Electro-Chemical Corrosion at its Source

Why Unit Heaters Sometimes Fail

DURING THE PAST few years, the number of unit heater installations in industry has increased greatly. This increase is due to: (1) good heating efficiency of these units at nominal cost for installation and operation, (2) post-war rehabilitation of old plants without expense of complete replacement of heat radiation systems, (3) the very considerable volume of new construction.

Along with the increase in the unit heater installations, there has been an increasing number of failures. In almost all instances the failures have been in the lower portion of the vertical heating tubes and are caused by pitting through from the inside. This is significant in analysis of the problem.

The unit heater illustrated in Fig. 1 is typical except for the No. 8 copper wire which will be explained later. In normal operation it will be found that the steam trap opens to dump condensate at in-

By **HARRY M. SPRING**

tervals which permit the condensate to back up and flood the lower portion of the heating coils before the trap functions. This does not appreciably affect heat radiation and, thermally, it is far more efficient to operate this way than to have steam blowing through with no condensate seal at all. Even though attempts might be made to hold a constant condensate level in the lower header, the thermostatic trap (the type normally used) is not intended to be a precision instrument. Temperature lag is bound to cause condensate levels to fluctuate.

Pitting Causes

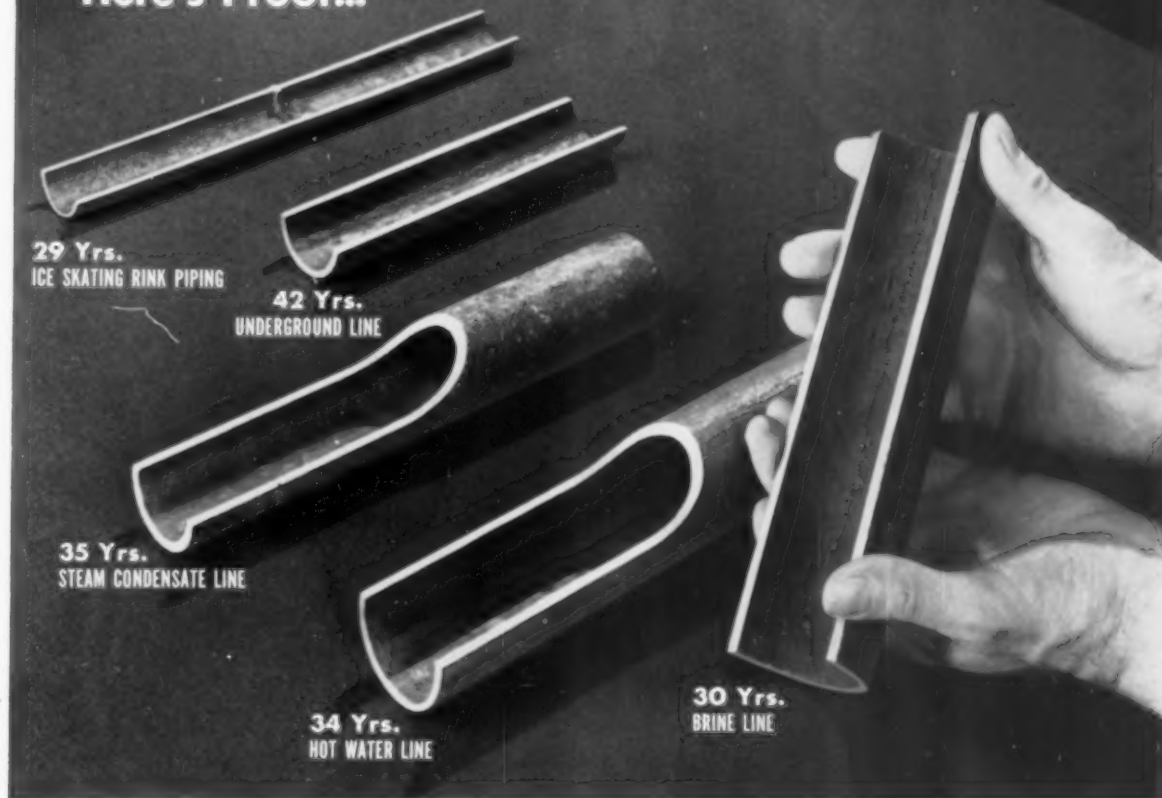
This brings us to the significance of the pitting failures which if they occur, are almost always at the lower ends of the heater tubes. Now we must dispel the belief of

some people that brass is non-corrosive.

We are going to consider electro-chemical corrosion. For the first step, let's examine the action of the conventional storage battery. Here, we have alternate lead and zinc plates spaced with wooden separator plates and submerged in an electrolyte. The latter is a liquid that is a good conductor of electricity. In the storage battery the electrolyte is usually a solution of sulphuric acid and distilled water. A self-generated current will flow between the plates of dissimilar metals when an external circuit is provided.

Bringing this analogy to the electro-chemical corrosion problems in the power and heating apparatus, it is mentioned now that there is a standard table known as the electromotive series of metals. This shows that when two different kinds of metal are submerged in a liquid and connected externally, a

Here's Proof...



WROUGHT IRON PIPE Saves because it Serves longer

True, there's no set rule for predicting how long a pipe material will last in any corrosive service. But there are a lot of mighty dependable clues. The most practical and dependable of all is *service under actual field conditions*.

How does wrought iron pipe measure up when this service-life yardstick is applied?

The answer is documented in the pipe sections shown above. Here you see *actual* samples taken from wrought iron pipe installations in a variety of services. Some of these sections came from buildings that were being torn down. Some were

actually cut from in-use installations by our laboratory staff. These sections are interesting not only from the viewpoint of service life, but also pipe condition.

You'll find the reason for wrought iron pipe's ability to last longer in the material's structure and composition. Tiny fibers of glass-like iron silicate are threaded throughout the body of high-purity iron. These fibers are immune to corrosive attack. When corrosion strikes, these fibers halt and detour the attack, prevent rapid pitting and penetration. When you consider that there are more than 250,000 of these fibers to each

cross-sectional square inch of wrought iron, it's easy to understand why this material is more than a match for corrosion.

Our bulletin, *Piping for Permanence*, tells more of this story, and covers a variety of services where wrought iron pipe saves because it serves longer. Write for your copy.

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current will be produced. The greater the conductivity of the liquid, the greater the current flow. And, the further apart the metals are on the electro-motive series table, the greater the current flow.

Fig. 2 shows a simple device for testing samples of condensate and various types of metals as used by the author. The current flow is measured in millionths of an ampere by a micro-ammeter in the external circuit. An instrument having a range of 0-100 m a is usually recommended. Recent tests in the laboratory and in the field have shown current flow from brass to steel, through various samples of condensate, of from 10 m a to slightly over 100 m a.

It is true that the current flow is small, but it should be recognized that it is continuous and localized or pinpointed where discontinuities of metal composition favor greatest differential in the electro-motive series.

Carry-over from the boiler, release of CO₂ from improper boiler water treatment or from other sources are but two factors that greatly affect conductivity of condensate in the unit heaters and which contribute to the rate of electro-chemical corrosion or pitting.

Some readers may have this electro-motive series of metals available and they may note that it shows current flow should be from steel to copper. To avoid confusion, it is explained that: (1) The table was established for all conditions at 20 C, and at higher temperatures a reversal in flow may occur. And, (2) seldom is pure copper used in heating coils. Frequently, there are traces of other nonferrous metals which will invite localized attack.

Often brass is used. Here there is an appreciable amount of zinc. The zinc may go into solution electro-chemically, leaving "spongy copper." This process is called dezincification. In any event, electro-chemical corrosion is involved, and leakage is the end result.

Now then, we are faced with a steel condensate return pipe connected internally by condensate with the heater tubes. Metallically, the electrical circuit is insulated by pipe thread compound at the joints

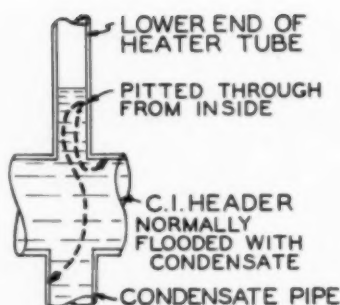


Fig. 3. Dotted lines show path of electro-chemical current flow.

so that the path of least resistance from electrical current flow between the dissimilar metals may be through the condensate, Fig. 3.

Turning back to Fig. 1, it should now be readily apparent why we

have used the No. 8 copper wire to short circuit or by-pass the high resistance of the pipe connections and to provide a path for flow of current between the dissimilar metals that will be more attractive than through the condensate, no matter how high conductivity of the condensate may be.

This has been recommended for several plants during the past few years. To the best of the author's knowledge, it is a relatively new approach to a rather messy problem. This article will enable many more plants to try this inexpensive approach which is merely a practical application of a well known engineering concept. There appears to be much promise that the application will at least reduce the problem.

Incineration of Industrial Solid Waste

(Starts on page 54)

smoke emission and improve temperatures to a point where no odor problem should exist. However, better operation can be realized with the provision of an auxiliary blower to supply secondary air and obtain better penetration and turbulence. The installation of a damper in the breeching could bring about better control of burning rates. The additional refractory aided considerably in producing higher temperatures and retaining more solids within the system.

The operator stated that he could see a great improvement in the burning efficiency. Another important fact he brought out was that the amount of solids trapped within the settling chamber was over double that trapped previously. It is hard to state just what part increased burning efficiency had in the latter statement.

In conclusion one important factor to consider is the human element for no matter how well designed or how well equipped an incinerator may be, the operator will control to a large extent its final operating efficiency. A plant that disposes of large amounts of

waste should carefully select and train the man who will be assigned to operate the incinerator. Proper firing methods established through experience will add much to the best of design.

The changes in the test incinerator did not solve all the problems nor did this article touch on all the factors to be considered. Additional information of this type, based on actual test data, is vitally needed in order to accomplish improvements needed in the process of incineration.

For those who are interested in obtaining more information on incineration I suggest they contact the following organizations which are currently working on the problem.

Air Pollution Control Association
4400 Fifth Avenue
Pittsburgh 13, Pa.

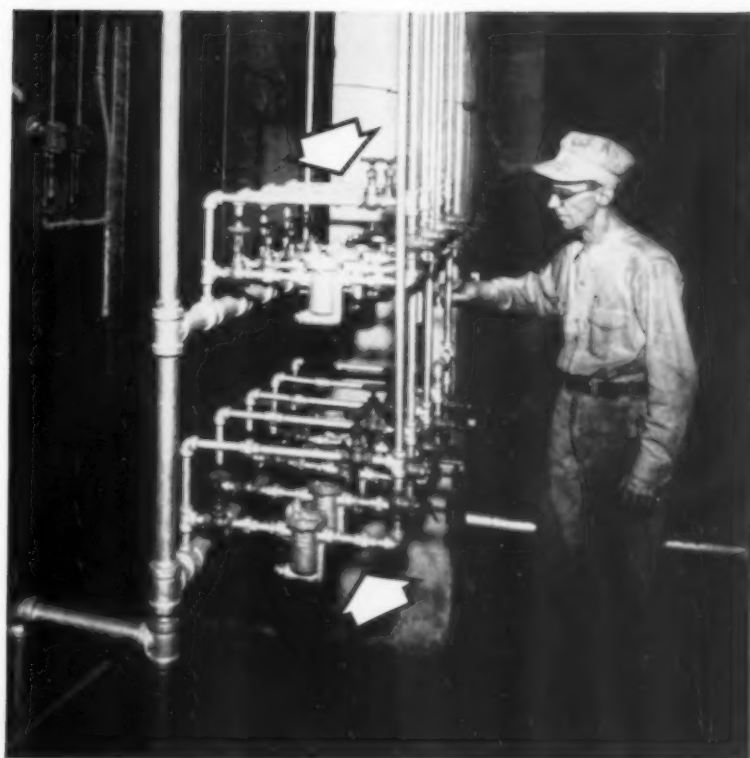
United States Bureau of Mines
Washington 25, D. C.

Acknowledgments:

1. Incineration Design Standards; Research Findings. Andrew Rose, Jr. and Hoyt Crabough, Air Pollution Control District, Los Angeles County.
2. Incineration. Richard C. Corey, Chief Fuels Technology Division, U. S. Bureau of Mines, Pittsburgh, Pa.

Good Trapping Practice with Good Traps
Roy Davis, Maintenance Superintendent, looks over one of the well-engineered Armstrong trap installations he has made at the Masonic Temple in Detroit. Traps discharge to 15" vacuum.

Keeping the Coffee Perkin' with Armstrong traps draining steam heated coffee urns.



Detroit's Masonic Temple Solves Vacuum Loss by Installing Armstrong Inverted Bucket Steam Traps

■ MANY AN engineering hour has been spent ferreting out the leaks in a vacuum return system. Here's a tip if you have the problem: *check your steam traps*. Don't worry about flash steam from traps—look for the traps that are leaking live steam. Take the case of the big Masonic Temple in Detroit:

The 11,600,000 cubic foot building has banquet space for 4500 persons at a sitting. Imagine the bedlam in the kitchen when the steam heated cooking equipment couldn't meet dinner schedules!—simply because condensate drainage was sluggish. The cooks were always in a stew and calls to the maintenance department were daily occurrences.

The building buys 35 lb steam from Detroit Edison. Line pressure is used for the cooking kettles, while regulating stations supply 2 to 3 lb steam for the heating system.

Couldn't Hold Vacuum

Prior to the installation of Armstrong traps, maximum vacuum

attainable was 4 inches and in some cases it was necessary to manually drain the systems and dump the condensate.

According to Roy Davis, Maintenance Superintendent, the installation throughout of Armstrong inverted bucket steam traps has solved the problem. "I don't remember having had the chefs complain since . . . the kettles heat in a hurry now."

F. W. Emblin, Operations Man-

ager, adds, "You can check the vacuum gage any time now and seldom find less than 15" showing."

There's another nice part to this story that only time will reveal: Armstrong traps have a habit of delivering this kind of service on low pressure vacuum return systems for years and years without repairs. Your local Armstrong Representative has plenty of cases he can tell you about. Why not call him today?

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Company

Street Address

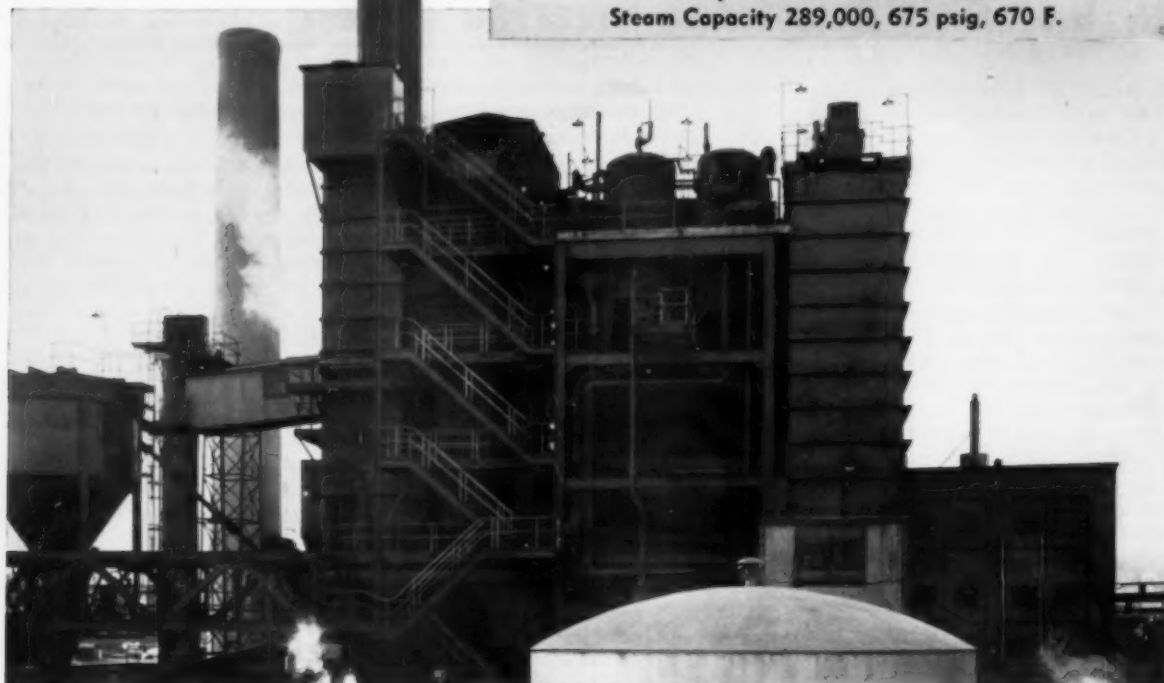
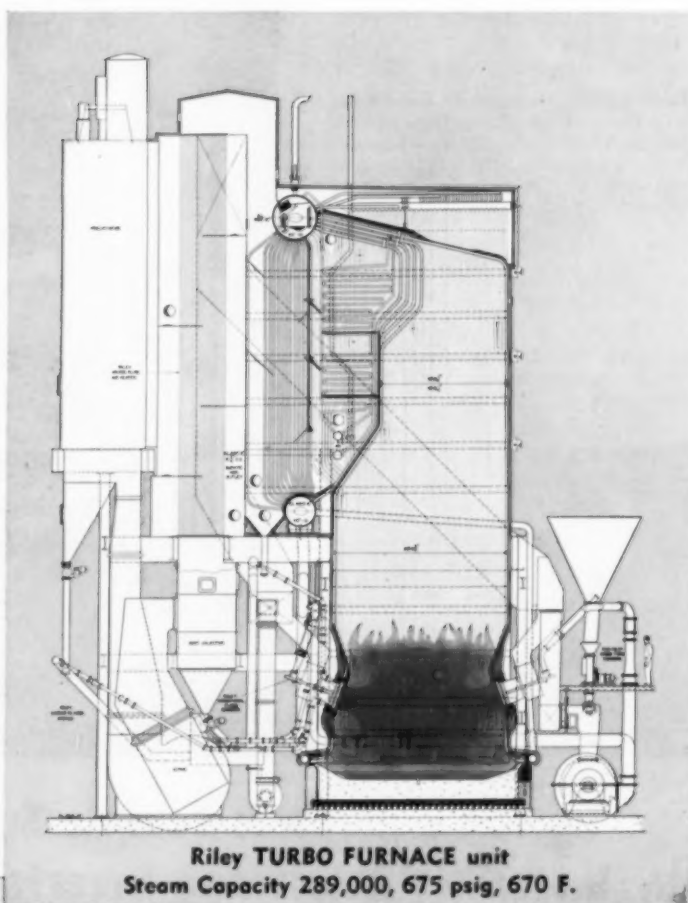
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This 289,000 lb./hr. Riley TURBO FURNACE Unit replaces several low capacity, low efficiency units and is part of a modernization program that has resulted in a total of \$470,000 annual savings on the making of steam by the original boilers. A considerable part of this saving is due to the TURBO FURNACE Unit's high efficiency, low carbon loss in fuel, lower maintenance, elimination of flyash disposal problem.

One of two TURBO FURNACE Units and one of a total of 26 Riley Units purchased by this chemical company . . . a total steam generating capacity of five and one half million pounds per hour!



***A survey of your plant by a consulting engineer could show you
ways of making surprising savings in your power costs.***

TURNS FLYASH INTO PROFITS

for prominent West Virginia Chemical Company

The *New* **RILEY**

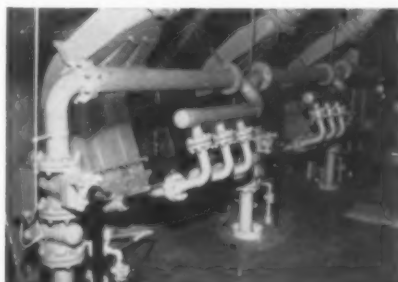
TURBO FURNACE

Once flyash disposal was a major problem for this company. Today Riley TURBO FURNACE Units are helping to solve this problem. At Plant (A) flyash is reinjected into the TURBO FURNACE combustion zone where high heat concentration and extreme turbulence converts ash to slag; when tapped and cooled, slag is easily disposed of, resulting in a usable product and a substantial savings in net cost of plant operation. At Plant (B) another Riley TURBO FURNACE unit successfully burns its own flyash . . . and even flyash from an adjacent dry bottom unit.

... in addition to eliminating flyash disposal, the Riley TURBO FURNACE also offers users these advantages:

- Will burn efficiently a wide range of coals, oil, gas, lignite, delayed coke, and fluid coke.
- Low carbon loss increases unit efficiencies, lowers fuel cost.
- Clean heating surfaces do away with slag blowers.
- No stratification of furnace gases.
- Furnace exit gas temperatures are the same regardless of fuel.
- No change in pressure parts needed when converting to solid fuels.
- One level burner operation.
- Higher heat release rates: lower overall height.

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Riley Directional Flame Burners use any fuel or combination of fuels; available with complete sequential automatic control.



Riley 550 Pulverizers with Tungsten Carbide faced grinding elements resist wear and reduce maintenance.

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TURBO FURNACE Units have been purchased by *Delaware Power & Light Co.* — three 500,000 lbs./hr. units designed for firing fluid coke; *Texas Electric Service Co.* — 825,000 lbs./hr. reheat unit designed for firing gas, oil and Texas lignite; *Louisiana Power & Light Co.* — one 1,550,000 lbs./hr. reheat unit designed for firing gas, oil, coal and fluid coke; *Kaiser Aluminum & Chemical Corp.* — two 320,000 lbs./hr. units for gas and oil, future coal.

Consult your Riley Representative in these cities for complete details about the Riley TURBO FURNACE. Worcester, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.



Boiling Water Reactor Power Plant

AN EXPERIMENTAL boiling-water reactor power plant is being built by Argonne National Laboratory near Chicago with Allis - Chalmers Manufacturing Company as the principal contractor.

In the boiling-water reactor, designed specifically for power purposes, water is generated into steam in a manner analogous to that of the conventional steam generator. Steam generated in the reactor is supplied directly to the turbine thus eliminating the requirement of a heat exchanger between the reactor coolant and the working medium of the power plant.

A model of the new power plant (see illustration) was exhibited at the First U. S. Trade Fair of Atomic Industry in Washington, D. C., at the Pacific Gas & Electric Company's open house in San Francisco, at the "Man—The Atom and the Future" exhibit in New

By JOHN F. LEE

**SPI Consultant on Atomics and
Professor of Mechanical Engineering
North Carolina State College
Raleigh, North Carolina**

York, at the Chicago Exposition of Power and Mechanical Engineering, and at the International Atomic Exposition in Cleveland.

Explanation of System

Referring to the picture of the model we can make an imaginary visit to the power plant. The picture shows a 1/32 scale model of a nuclear fueled power plant designed expressly to generate electric power. This 5,000 kw plant, called the Experimental Boiling Water Reactor, was conceived by Argonne National Laboratory as part of the Atomic Energy Commission's five - year program to bring the United States the benefits of competitive nuclear power.

Data for the reactor design were developed by Argonne National Laboratory in extensive experiments, including three small boiling water reactors operated experimentally at the National Reactor Testing Station near Arco, Idaho.

The Reactor

The first stop inside the plant is the reactor itself. Heat from fissioning of uranium atoms in the slightly enriched fuel elements of the core causes the water to boil and produce steam at 600 psig and 488° F. The rate of heat generation can be varied at will by moving the neutron absorbing control rods in the core. Mechanical drive mechanisms for moving the rods are located in a room beneath the reactor.

Steam generated in the reactor core passes upward into the steam dome above the water level in the reactor pressure vessel. Almost all

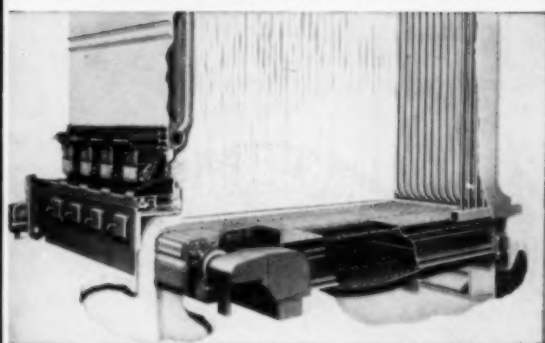
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at spreader stoker firing*

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stoker advantages



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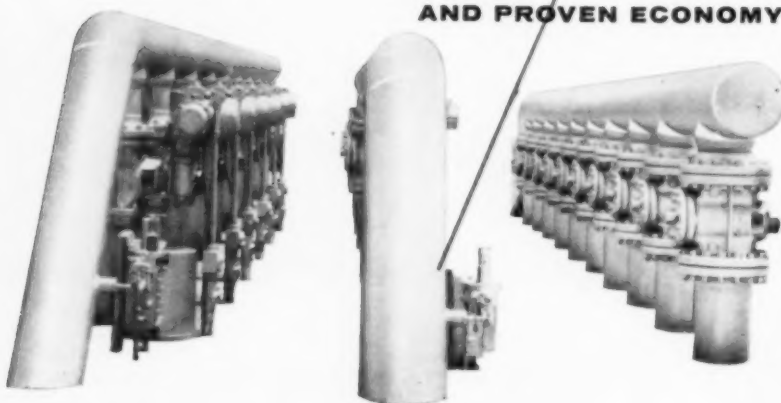
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Reactor Plant

(Continued)

of the water droplets settle out of the steam while it is in this dome. This is an important characteristic because very little radio-activity is carried out of the reactor if the steam is dry.

Steam Cycle

Steam is piped from the reactor pressure vessel through the thick concrete biological shield to a steam dryer which removes any moisture still remaining. The steam dryer vessel houses the moisture-separating device and contains cooling coils which can be used for emergency cooling of the reactor. Water separated from the steam, or condensed by the cooling coils, runs back into the reactor by gravity flow.

Beyond the steam dryer, the main steam line divides. One branch goes to the steam turbine generator. The other branch goes to the steam bypass control system.

The turbine generator is of a special design developed by Allis-Chalmers to prevent leakage of radioactive steam into the room or of air into the turbine.

The steam bypass control system is designed to divert to the condenser any excess steam produced by the reactor over and above the instantaneous demand of the turbine generator. This allows the reactor to operate at constant power level while short term variations in customer's demand for electricity are taking place.

After steam has released its energy to the turbine, it is exhausted to a surface condenser developed for this type of service. Because aluminum does not become as radioactive as copper, aluminum tubes are used instead of the usual copper alloy. Double tube sheets with lead collection points between, prevent mixing of radioactive water with the non-radioactive water in the cooling tower circuit.

Condensed steam is pumped from the condenser and back into the reactor by feedwater pumps. These pumps are of a design which minimizes corrosion of pump parts and

MODERN STOKER-FIRED BOILERS

Despite the relatively wide extent to which oil — and gas — have come into use for firing industrial boilers, the fact remains that coal continues to be the most economical fuel available in many areas.

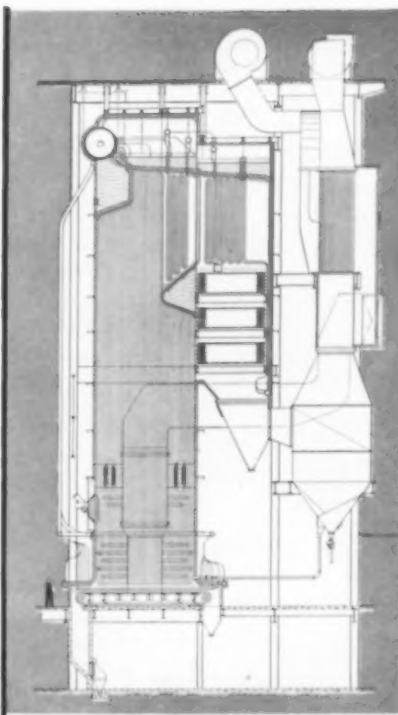
Moreover many potential coal users are unaware of the tremendous improvements that have been made in recent years in the design and general effectiveness of mechanical stokers. Here at Combustion virtually the entire stoker line has had extensive design changes, all directed at improved performance. But overall performance is tied in inescapably with boiler performance. At Combustion you have the important advantage of dealing with a leading boiler manufacturer that also offers the most complete line of stokers available anywhere. You are assured, therefore, of a completely coordinated design comprising stoker, boiler, furnace and — if desired — heat recovery equipment and/or auxiliaries, all engineered specifically for your particular requirements.

Displayed below are three — of the many — C-E stoker-fired boiler designs which, collectively, are suitable for any coal-firing conditions.

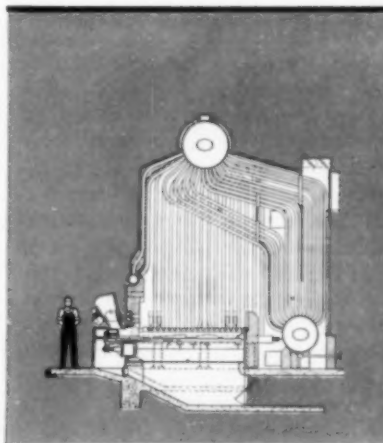
At the right is illustrated the latest — and largest — example of the C-E Bark-burning Unit, a design pioneered by Combustion and now widely used for burning bark, hogged-wood and other waste wood fuels.

So — when you are in the market for coal or other solid-fuel-burning units it will certainly be to your advantage to find out what Combustion Engineering has to offer. Our engineers will be glad to discuss your needs with you or your consultants.

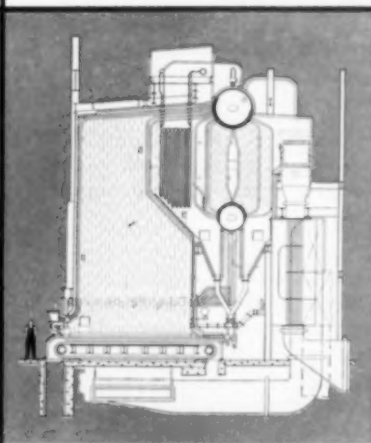
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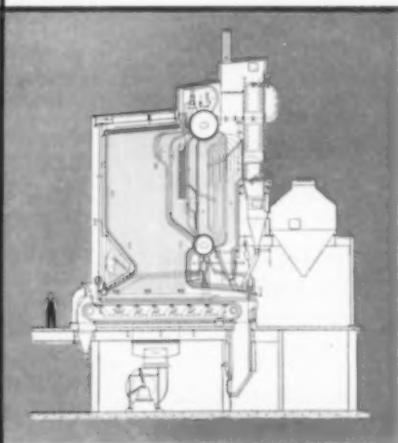
C-E BARK-BURNING UNIT for a paper company. This is a very large unit; capacity — 450,000 lb steam per hr, operating pressure — 1335 psig; total steam temperature — 958 F. It is designed to burn bark, natural gas, oil or any combination thereof. These units are in service for capacities as low as 20,000 lb of steam per hr.



THIS C-E VERTICAL-UNIT BOILER, TYPE VU-10 fired by a C-E Underfeed Stoker, Type E is for a dairy. Capacity is 30,000 lb steam per hr at 150 psig. VU-10 Boilers are available for capacities from 10,000 to 60,000 lb of steam per hr. They are often equipped with C-E Spreader Stokers, dump grate type.



ONE OF TWO DUPLICATE UNITS for a chemical company comprising C-E Vertical-Unit Boilers, Type VU-40 fired by C-E Spreader Stokers, continuous discharge type. These are baffless boilers designed for a capacity of 150,000 lb steam per hr at 900 psig and 808 F. Coal is Eastern Bituminous.



THIS C-E UNIT is being installed for a soap company. It comprises a C-E Vertical-Unit Boiler, Type VU-50 fired by a C-E Traveling Grate Stoker. Coal used is Midwest Bituminous. This boiler is designed for a capacity of 100,000 lb steam per hr at 850 psig and 585 F. It is an outdoor type unit.

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Reactor Plant

(Continued)

prevents out-leakage of air. After being pumped back into the reactor pressure vessel, the water has gone through a complete cycle and is again ready to be converted into steam.

Leakage Control

Since the steam and water in the primary circuit are radioactive, leakage from the system must be minimized. Air or corrosive particles which get into the water as a result of leakage or corrosion would become radioactive upon entering the reactor, and a fraction of this radioactivity will emerge from the reactor with the steam.

The amount of radioactivity must be kept small if complicated maintenance operations are to be avoided. The function of the air drying and fluid recovery system, together with the special seals on power plant equipment, is to prevent in-leakage of air or out-leakage of radioactive steam or water.

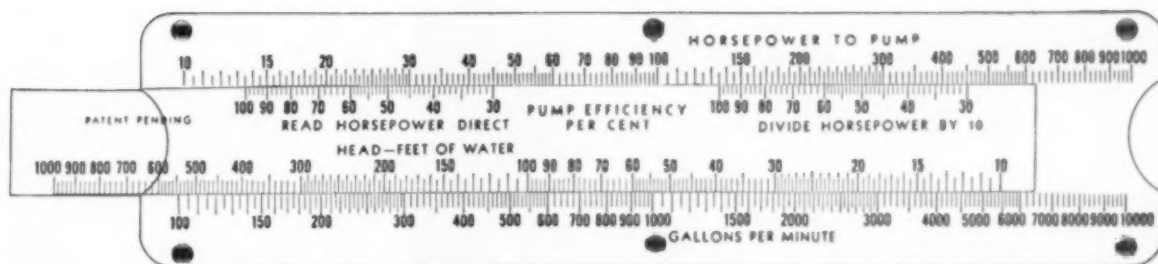
This recovery system takes air and vapors from the seals and the air ejectors to a refrigeration cycle which reduces the vapor temperature, thereby condensing most of the moisture in the vapor. The moisture that remains in the air is removed by a chemical dryer and the resulting dry air is returned to the sealing system.

The dry air lost to the atmosphere through the shaft seals is replaced by the makeup air section of the system which removes moisture from the room air. This moisture is not returned to the system as is the condensate from the recovery section of the drying equipment.

Safety Features

Since experience with nuclear power plants is limited, safety considerations have been paramount in the design of equipment for the entire plant. A gas-tight steel shell, 80 ft in diameter, surrounds the entire power plant to prevent escape of radioactivity from the building even in the very remote event that such radio-

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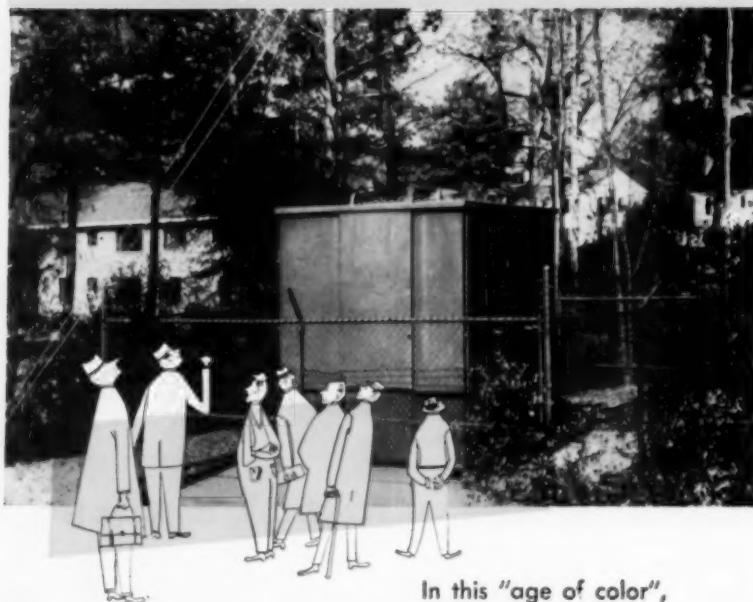
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Subox paints offer a complete paint system. Often the same variety functions as both primer and finishing coat and may even answer the need for reflectivity as well as radiation.

Send for color cards and data book "Subox Paints".

*Trade Mark

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6 Fairmount Plant, Hackensack, N. J.

See Catalogues in Sweet's Industrial and Engineering Files



Reactor Plant

(Continued)

activity escaped the reactor itself.

Entry to this gas-tight building is through an air lock in which only one door can be open at one time. A 15,000 gallon reservoir of water for emergency cooling is suspended from the dome of the building. By discharging through the building spray system, this water would quickly reduce any excessive pressure resulting from a rupture in the steam cycle, thus reducing leakage from the gas-tight building. The spray system, not shown in this model, would also wash out suspended radioactive particles from the building atmosphere.

Simplicity

In closing, it is emphasized that the boiling water reactor operates on a direct steam cycle. Steam produced by boiling water in the reactor core is fed directly, without any intervening heat exchanger or boiler, through the turbine and into the condenser where it is condensed and pumped back to the reactor. The basic simplicity of such a plant will be reflected in low construction costs and in the ultimate low cost of electricity produced for houses and factories.

Nuclear Power Big Business

(Starts Page 39)

accumulate in fifty years to a point where 5% of the entire ocean volume would be contaminated. Since this state of affairs is unacceptable some other method of disposal must be found. Relatively small quantities of Strontium-90 can quite readily cause bone cancer since it behaves very much like calcium and has a strong affinity for bone.

The report suggests that Strontium-90 be removed from radioactive waste before their disposal. This would alleviate the problem

of disposal considerably but the cost of a separation is an important factor which can not be taken lightly by the operators of nuclear power plants. The report goes on to say that certain types of reactors such as the liquid-metal-fuel reactor (SP&I for January, 1956, page 87), simplify the processing of radioactive wastes and could result in moderate costs.

Foreign Market

Another factor in the Hughes' report concerning U. S. Government restrictions on commercial relations between American firms and foreign customers came up for its share of attention at the Nuclear Science and Engineering Congress. Senator Clinton P. Anderson, chairman of the Joint Congressional Committee on Atomic Energy, assailed the United States' policy of secrecy about the peaceful uses of atomic energy as hampering American firms in their attempts to get a share of the foreign market. Senator Anderson warned that because of unwarranted secrecy "Americans may find it difficult to sell atomic reactors abroad because they have to sell miles of red tape along with each reactor."

Senator Anderson drove his point home by telling of the experience of an American firm which was negotiating the sale of a nuclear reactor to the Dutch. "The Dutch wanted to know whether they could get nuclear fuel. The reply was, I hear, that by the time the reactor was built we might have a policy. We don't know what the price will be. We don't know whether the fuel will be enriched or natural uranium. We don't know what we will do about the reprocessing of the used uranium. But we would surely be glad to sell them a reactor."

"Meanwhile, the British say that they will sell them a reactor and the Belgians say they will sell them fuel. Who do you think will sell the Dutch the reactor? What would you do? This illustration can be reenacted in Italy, in France, and even in Tibet."

Senator Anderson declared that "the time has now arrived when we should declassify, and not merely

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the efficiency of your hydraulic unit with Roper dependable Pumps. Get optimum performance from the pumps that feature just two moving parts — equal size gears operating in a sturdy case with proper clearance for superior service and long life. The models shown are representative of standard Roper pumps suitable for most applications.



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maintenance costs with a Roper. For instance, a pump like the Series H with pressures to 1000 P.S.I., sizes 10 to 75 G.P.M. is ideally suited for hydraulic mechanisms and for other applications requiring high pressures. Spur gears run in axial hydraulic balance . . . bearings and bronze wear plates reduce friction under heavy loads. Available with packed box or mechanical seal.

PUSH

the unit in your hydraulic circuit with the correct size Roper for the particular job. In many cases the Series K will do, for it is rated from pressures to 150 P.S.I., capacities $\frac{1}{4}$ to 50 G.P.M. This model is compact, sturdy . . . is self-lubricated by liquid pumped . . . handles total suction lifts up to 25 feet. Comes with packed box or mechanical seal . . . with or without relief valve.

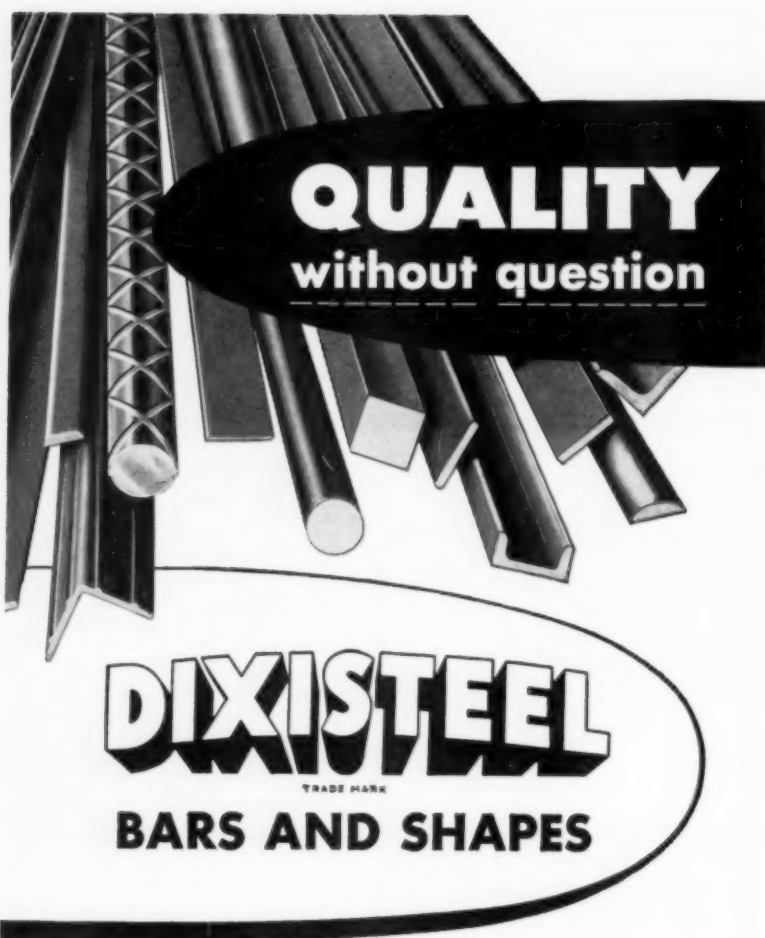


ROPER
Rotary Pumps

GEO. D. ROPER CORPORATION
434 Blackhawk Park Ave., Rockford, Illinois

PULL

favorable comment on a wise choice when you install a Roper as original equipment. Among the dependable Ropers is the Series F Pump — pressures to 300 P.S.I., sizes 1 to 300 G.P.M. It features four-part design with 8 optional piping arrangements . . . supplied in standard or stainless steel fitted models. With packed box or mechanical seal; with or without relief valve.



The name DIXISTEEL may be new to you, but to many of our customers it is as well known and respected as the word *sterling* on silver.

There is never a question about quality when the bars and shapes you buy bear the name DIXISTEEL.

From molten steel to finished products every operation is checked and re-checked by metallurgists, chemists and specialists, to make sure of proper physical characteristics, finish and tolerance.

Specify DIXISTEEL bars and shapes—plain or galvanized—and be sure of the finest quality.



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Nuclear Power Big Business

(Continued)

downgrade, all our work in the controlled hydrogen field." He added that "My hope tonight is that we let this new atomic industry try its wings in free air as Britain, Belgium, France and West Germany seem now to be doing."

Safety Tests

Reports of safety tests on two types of atomic reactors by the Atomic Energy Commission were given at the Nuclear Science and Engineering Congress in Cleveland. Clarence E. Larson, formerly director of the Oak Ridge National Laboratory and now vice-president in charge of research at National Carbon Company, described the safety experiments. In one experiment conducted by Argonne National Laboratory at Arco, Idaho, a solid-fuel type of reactor was thoroughly tested by spring-loaded control rods which were shot out of the reactor with a resulting sharp increase in power. It was demonstrated that greatly increasing the power in a short time results in boiling the water used as a reactor coolant. Boiling, in turn reduces the effectiveness of the moderator which results in a decrease in the power. The net effect is that after the initial excursion the reactor settles down to some lower power level at which the water boils rather steadily.

During these tests some warping of the fuel elements was noted and some steam was forced out of the reactor. However, no serious incident occurred. In the final test the power was drastically increased to a level of about 1,000,000 kilowatts in a tenth of a second. In this test, the reactor core was destroyed and some of the auxiliary equipment failed due to steam explosions. Dr. Larson pointed out that the conditions of the final test could not be achieved accidentally but only by deliberate intent.

Another test of a similar nature was conducted at Oak Ridge on a



**CONTROL OF
OVER 130 BOILER
FUNCTIONS**

at Ridgeland Station,
Chicago is centralized on
these Republic electronic
benchboards.

Controlling Combustion Electronically at World's Largest Cyclone-Fired Plant

Commonwealth Edison's 640,000 KW Ridgeland Station near Chicago is the largest completely cyclone-fired power plant in the world. A total of 28 cyclone furnaces fire the plant's six boilers.

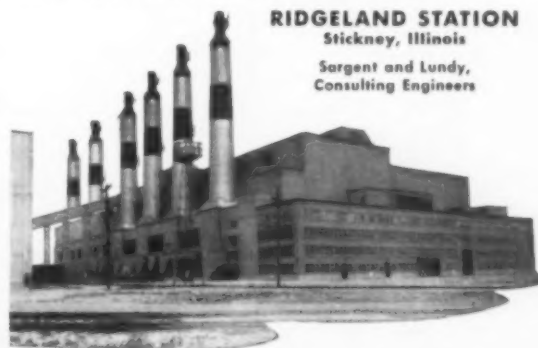
To maintain maximum firing efficiency, combustion conditions at each cyclone are individually controlled and integrated with over-all plant operation by a Republic Electronic Combustion Control System. The system provides separate controls for primary air, secondary air, fuel feed and fuel-air ratio at each of the 28 cyclone furnaces in addition to controlling forced and induced draft fans and feedwater pumps on each boiler. All told, there are more than 130 individual controls which are automatically coordinated for continuous proper combustion.

Republic Electronic Controls handle all of these functions without introducing transmission lags, complicated pneumatic-mechanical linkages and inaccuracies due to mechanical inertia into the control system. Integration of control information is greatly simplified by use of electronic circuits. Expensive panel piping is eliminated and control panels are easier to operate. Because transmission of control impulses is electrical, all parts of the

control system can respond simultaneously for smooth, coordinated operation of the boilers.

Ridgeland is but one of many modern cyclone-fired power plants that are equipped with Republic Combustion Controls. In fact, more cyclones are controlled by Republic than by any other make of controls.

Republic makes a complete line of combustion controls for all types and sizes of boilers, all methods of fuel firing, all load conditions and all arrangements of draft. Write us when your problem is combustion controls.



RIDGELAND STATION

Stickney, Illinois

Sargent and Lundy,
Consulting Engineers

REPUBLIC FLOW METERS CO.

2240 Diversey Parkway, Chicago 47, Illinois

Nuclear Power Big Business

(Continued)

homogeneous reactor in which the fuel is in a liquid solution. In this type of reactor no boiling and no apparent damage was observed under the most extreme test conditions. The power simply leveled off. Furthermore, the tests showed that there is a very pronounced coupling between power demand and supply in the homogeneous reactor. This is an important factor for a power reactor because when more power is required the reactor produces it without any action on the part of the operator. The converse is also true with decreased power output matching decreased demands without a need for the operator to act.

The tests performed on the two reactors confirmed a conviction of long standing that a reactor, even when deliberately put out of control, can not explode like an atomic bomb.

French Atomic Plants

The French have launched an ambitious program for the construction of nuclear power plants. Marcel Flouret, chairman of Electricite de France, the second largest electric utility system in the world visited the United States and Canada to confer with leading utility executives. He went away very much impressed with our approach to the problem and stated that our efforts confirmed his conviction that the French are on the right track. Before leaving the country M. Flouret revealed French plans for atomic power developments.

Their firm plans include a 5,000-kilowatt demonstration atomic power plant which will go into operation in the Rhone Valley next year. Within two or three years there will be two additional 25,000-kilowatt atomic power plants. A fourth atomic power plant having a capacity of 50,000 or 60,000 kilowatts will be in operation by 1960. After this, the French have definite plans to double atomic power capacity every three years.

UNDER A BLANKET

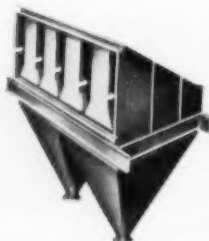
OF dust...



Your plant and equipment suffers . . . your community goodwill fades away. These problems can be solved. Prat-Daniel Collectors are designed for the control of industrial dusts and flyash. Multiple small diameter tubes provide powerful centrifugal forces, resulting in sustained high collection efficiency . . . even with ultra-fine dusts.

Whether the problem is industrial dust or flyash, you are assured of satisfaction with P-D Collector Systems, engineered to meet your specific needs.

Write for Reprint No. 102 titled, "What Type Collector?"



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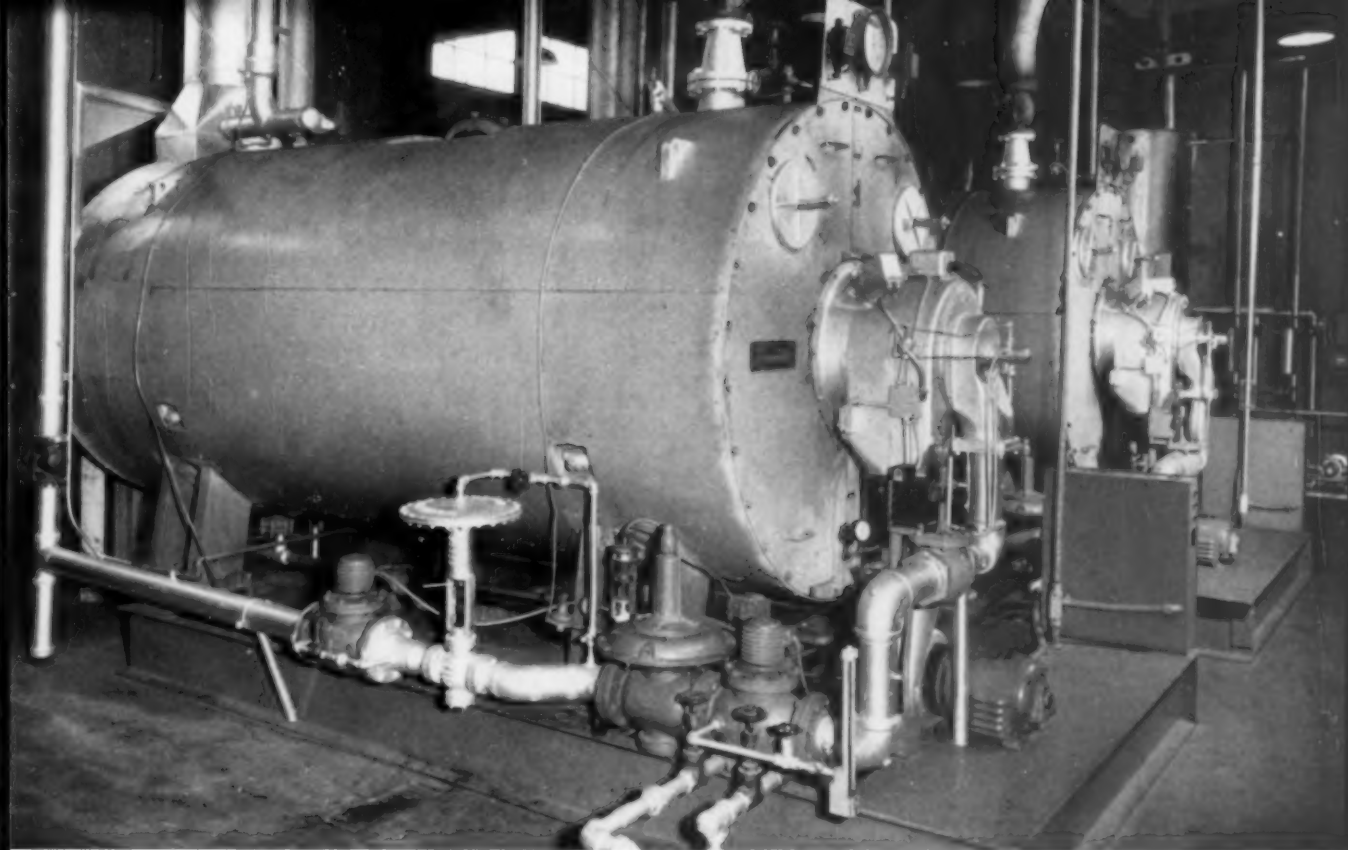
Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Que.

Designers and Manufacturers

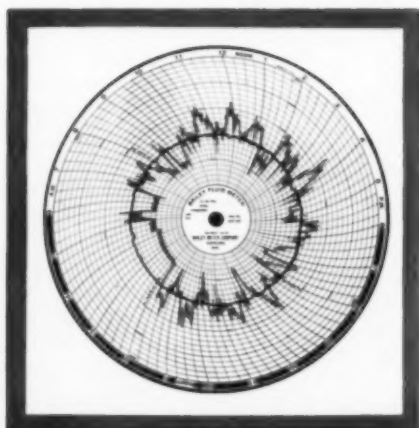
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POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks



Powermasters Give Dairy Round-the-Clock Reliability



This 24-hr. pressure and flow chart shows the ability of the *Powermaster* to hold constant pressure under widely varying steam flow conditions. The basic simplicity and rugged construction of the *Powermaster* modulating burner control promptly adjusts fuel firing rate to steam demand, thus, automatically holding boiler pressure constant throughout the entire steam demand range of the boiler.

● These two *Powermaster* Packaged Automatic Boilers operate 24 hours a day, seven days a week in a West Coast Dairy. Since installed over three years ago, they have been shut down only for routine inspection and servicing. That's cost-saving dependability!

Supplying fluctuating steam demands of 5,000 to 13,000 lb./hr., the *Powermasters* respond instantly to sudden and wide load swings with practically no change in pressure, and with high firing efficiency at all loads. This uniform and economical performance is assured by *Powermaster's* exclusive burner design and modulating fire control.

MORE than operating dependability and efficiency are secured with completely factory-assembled *Powermaster*. Space-saving compactness, simple installation, automatic time-saving operation, maintenance-saving accessibility, fuel flexibility and O&S responsibility for the complete unit are other reasons why *Powermaster* is a wise boiler investment for food plants or any other industries. Call in a *Powermaster* representative for full details. Request Bulletin 1220.

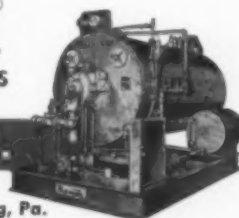
Powermaster®

PACKAGED AUTOMATIC BOILERS

Sizes to 500 hp.; pressures to 250 psi

ORR & SEMBOWER, INC.

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HELPING the *MAN-IN-THE-PLANT*

When Does it Pay to Retire a Pump?

A PUMP MAY still be delivering designed capacity and head despite its age. It is this fact, the seemingly satisfactory performance of the pump, that protects its reputation as an "old faithful" from closer scrutiny.

Consider a motor driven pump built in 1928 to handle 2,500 gpm against 150' total head. When

originally built, it had an efficiency of 78%, but now it has dropped to 74% requiring an input of 128 bhp.

A modern pump for these same conditions could have an efficiency of 86% requiring 110 bhp. This is a possible saving of 18 bhp. Based on a power cost of \$.01 per kwh, savings in power cost for one year

continuous operation (8760 operating hours) is \$1,176.00.

Savings Calculated

Calculation of power cost savings and capitalization amounts can be made quickly by using the accompanying chart. First compute the horsepower savings and multiply the results by yearly hours of operation.

The diagonal lines represent "horsepower savings." The abscissa shows "hours per year" of operation. Reading vertically up the "hours per year" to the "horsepower savings," to the left ordinate is the "annual savings" in power cost, and to the right ordinate is the "capitalization amount." Shown are 3 right hand ordinates, each for different interest rates and terms of years.

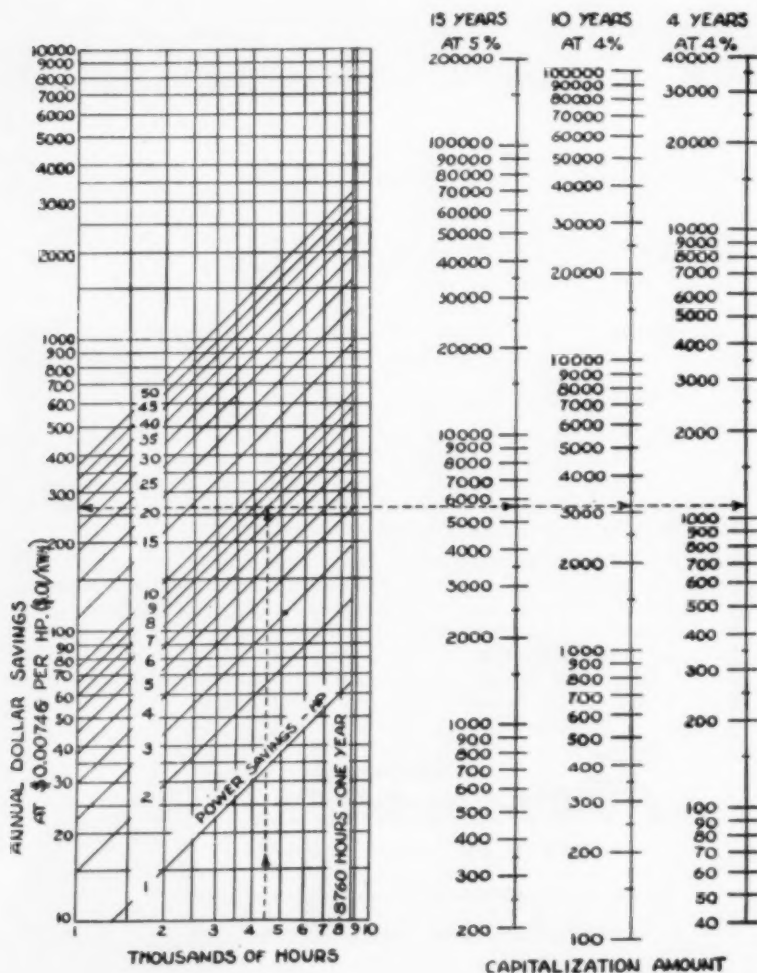
The chart is based on cost of power at \$.01 per kwh. If in a particular locality power cost is more or less, simply multiply answer from the chart by the ratio to actual cost.

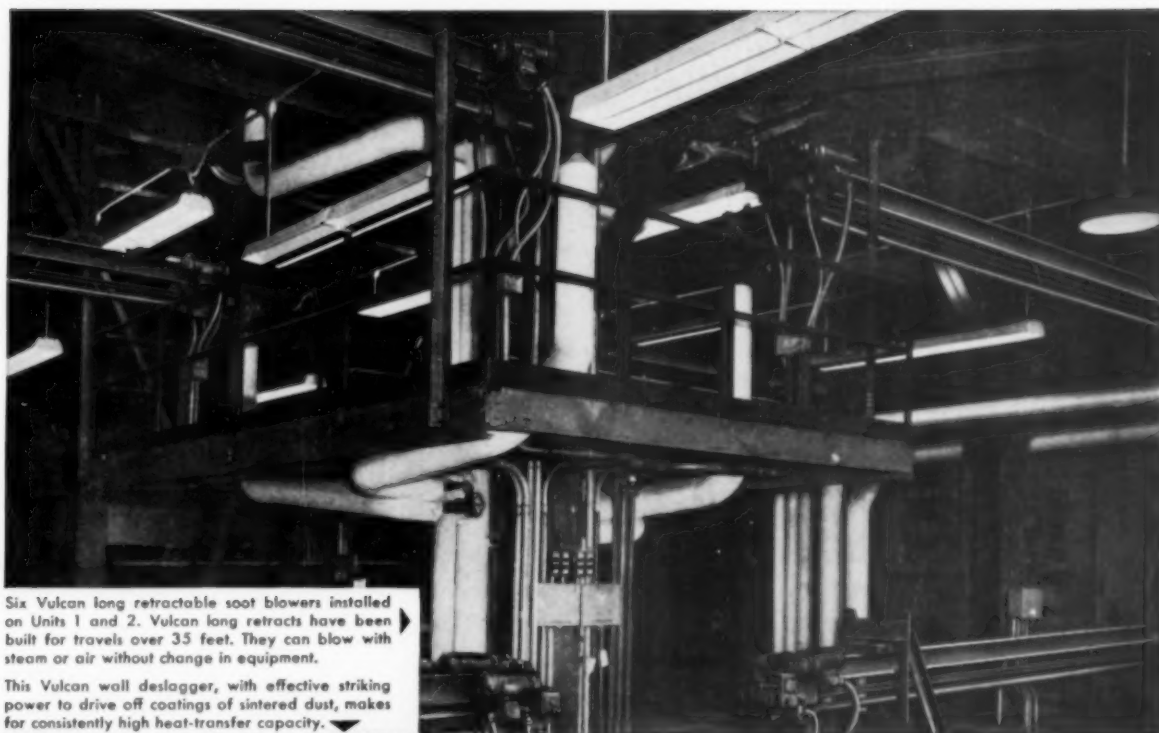
Examples

- Service Water Pump.** Consider a pump installed in 1926 having an efficiency of 70% and an input of 28.9 bhp. A modern pump for the same conditions (400 gpm, 200 ft total head) has an efficiency of 79% and an input of 25.6 bhp. This is a 3.3 bhp saving. Annual saving if service water pump runs 6000 hours per year is \$150. Capitalized in 4 years at 4% interest the total amount is \$630. The estimated price of a new pump for these operating conditions is \$438.
- Boiler Feed Pump.** 400 gpm, 650 total head at 220 F. 1930, efficiency 63%, 99.5 bhp. 1955, efficiency 69%, 91.0 bhp.

Saving—8.5 bhp

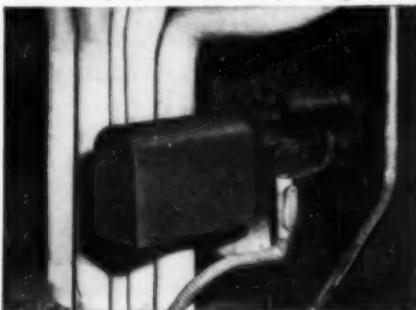
Annual saving if pump operated 8760 hours per year is \$560. An-



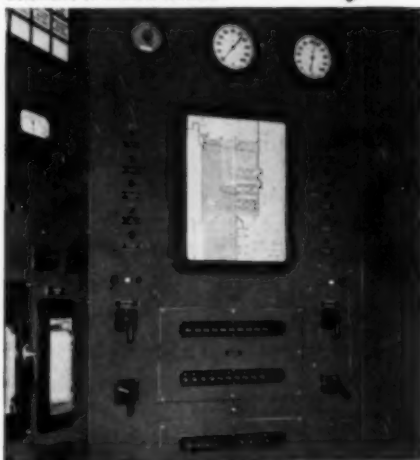


Six Vulcan long retractable soot blowers installed on Units 1 and 2. Vulcan long retracts have been built for travels over 35 feet. They can blow with steam or air without change in equipment.

This Vulcan wall deslagger, with effective striking power to drive off coatings of sintered dust, makes for consistently high heat-transfer capacity.



From this central control panel, the operator can check each step of the cleaning cycle; has choice of automatic or manual control.



Georgia Power Company installs VULCAN automatic-sequential soot blowing system

Keeping three Babcock & Wilcox reheater boilers effectively clean is a push-button operation at Georgia Power Company's Plant Hammond. That's because each boiler is equipped with Vulcan Automatic-Sequential Soot Blowing. The system includes both long retractable soot blowers and wall deslaggers.

The centralized control panel for each electrically-driven system is located in the main boiler control room. There the operator starts the cleaning sequence by simply pushing a button. He can see at a glance that each unit starts operation at the right time and pressure, blows for the proper period, and cuts out of service. If an individual blower requires more frequent or prolonged operation, manual control is right at his fingertips. With Vulcan, each boiler section is cleaned efficiently, automatically. No soot or slag accumulates to decrease operating efficiency.

No matter what size your boiler—whether it's power or process—you can increase operating efficiency and get low cost, effective cleaning with Vulcan Automatic-Sequential or Selective-Sequential Soot Blowing.

COPEs-VULCAN DIVISION
BLAW-KNOX COMPANY

ERIE 4, PENNSYLVANIA

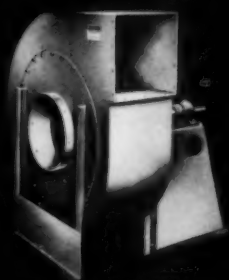


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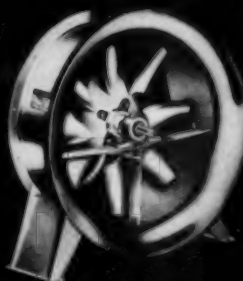
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Put Air to Work Economically for:

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For complete application service, call your Consulting Engineer or your nearest Sturtevant Division Sales Engineer... or write Westinghouse Electric Corporation, Sturtevant Division, Dept. 21D, Hyde Park, Boston 36, Mass.

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J-80581

Ideas & Methods (Continued)

nual savings capitalized in 10 years at 4% represents a total of \$6,700. Estimated cost of new pump is \$1,101.

3. **Water Works Pump.** 15 mgd (10400 gpm), total head—200 ft. 1926, efficiency 84%, 625 bhp. 1955, efficiency 89%, 590 bhp

Saving—35 bhp

Annual saving if pump operated 5000 hours per year is \$1,300. Annual savings capitalized in 15 years at 3% represents a total of \$24,177. Estimated price of new pump is \$4,054.

BY C. E. CROMWELL
De Laval Steam Turbine Co.

Plant Maintenance at Lockheed

IMAGINE a plant utilizing the power requirements of three cities of 45,000 people where the air conditioning system requires 11,230 hp and the floor space of the main building alone is 48 acres. Those figures give you a fair idea of the size of Lockheed's Georgia Division plant at Marietta. Because of the size of this plant and because it is wholly government-owned, several problems arise that make its maintenance program unique.

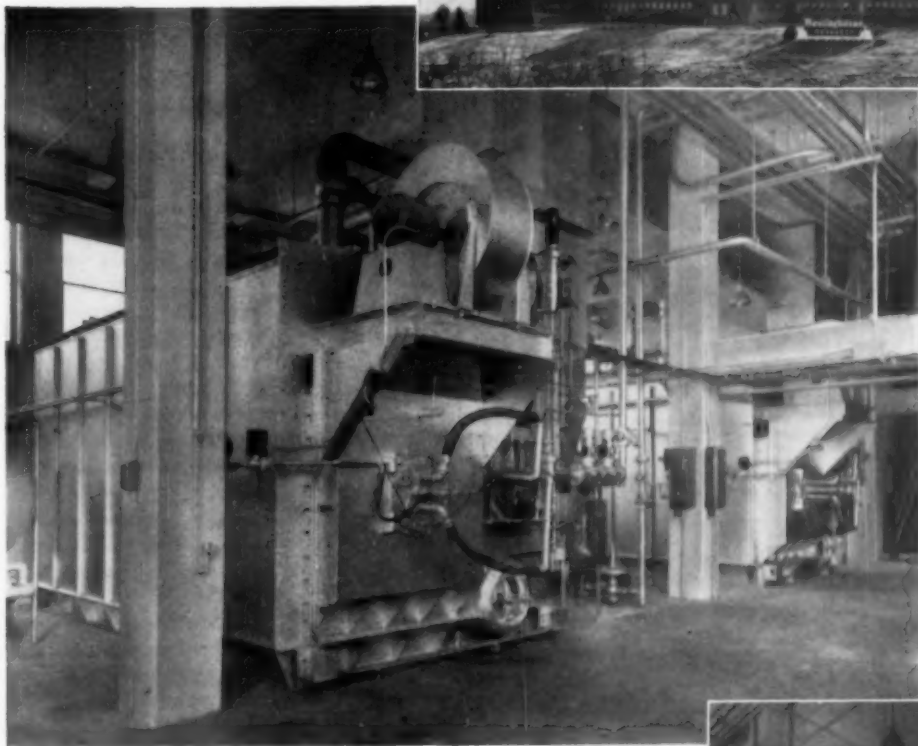
Soon after Lockheed took over operation in 1951, the Maintenance Division was set up to perform three different phases of work, repair, construction and preventive maintenance.

The construction program was first put into use in conjunction with the repair program, since the plant in its entirety was at that time a storage site for machine tools. Construction not only included new buildings, but also rearrangement and installation of machinery and plant facilities.

This necessitated the moving and shipping out of all machinery not to be used in Lockheed's operation, and installing the re-

TWO NEW KEELER TYPE D-K PACKAGE BOILERS SERVE NEW WESTINGHOUSE RESEARCH LAB

Westinghouse Research Laboratory
Churchill Boro, Pittsburgh, Pa.



KEELER

Type DK

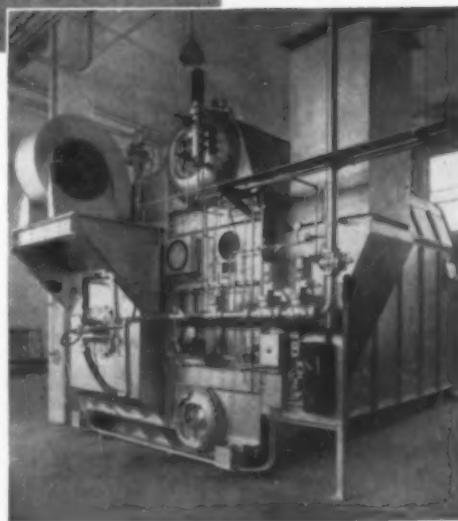
Newest member of the Keeler line—a compact, low-cost package steam generator (oil or gas fired) for limited space requirements.

Westinghouse Electric Corporation has selected two Keeler D-K Package Steam Generators to supply their modern new research laboratory with low cost steam for process and heat requirements. Keeler Boilers of various types and sizes are serving Westinghouse plants throughout the country and their efficiency, economy and dependability led to the purchase of the two D-K units pictured here.

Each of the new Keeler Type D-K Boilers shown are capable of generating 20,000 lbs. of steam per hour. The complete "package" includes all burning equipment, controls, safety devices and accessories for gas fired operation.

The Type D-K is made in oil or gas fired units with capacities from 8,000 to 45,000 lbs. of steam per hour, standard design pressure of 200 psi and a maximum design pressure of 325 psi. The D-K is specifically designed for use in power plants which will not accommodate long boilers of other types.

It incorporates the proven efficiency and economy of Keeler Water Tube Steam Generators in a new, compact design—a comparatively wide and short boiler that's completely steel encased and insulated, ready for quick hook-up and operation. Write or phone for complete information on this compact, new Package Power Plant!



The Seal of Quality in Water Tube Boilers

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No. DK-1: Type DK Package Boilers
No. F-14: Type CP Package Boilers
No. M-2A: Type CPM Package Boilers
No. MK-1: Type MK Boilers

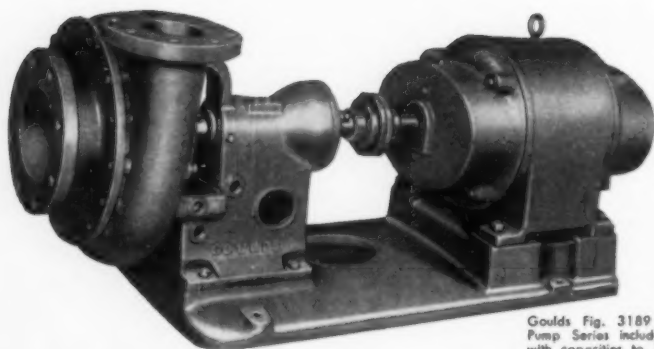


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Goulds Fig. 3189 Centrifugal Pump Series includes 10 sizes with capacities to 1080 GPM; heads to 180 ft.

interesting facts

... about a new series of Goulds Multi-Purpose Centrifugal Pumps

Newest in a line of heavy-duty centrifugal pumps reputed for their dependable, trouble-free operation, the Goulds Fig. 3189 Series offers you:

Versatility

You can use the Fig. 3189 single-stage, open impeller pumps for general water service, irrigation, circulation, slurries, transfer, factory wastes and for air conditioning. You can choose just the right pump for your need from 10 sizes with capacities ranging up to 1080 gallons per minute, with heads up to 180 feet at 1750 RPM.

Economy

The Fig. 3189 Series is made in the Goulds tradition—they're built to work hard and to last long. Their design accommodates wide interchangeability of parts, greatly reducing parts inventory requirements where many pumps are used.

Low Operating Cost

Modern hydraulic design provides high operating efficiency with relatively low power consumption. Impellers are statically and hydraulically balanced for smooth operation.

Operating Convenience

You can adapt the Fig. 3189 pump to various piping arrangements by swiveling the discharge nozzle to any one of three positions.

Maintenance Convenience

Wide openings in the support head give ready access to gland and stuffing box. Bearing housing is completely sealed to exclude moisture and dirt. You can safely use the unit outdoors without fear of dirt harming the bearings and you can hose it down without fear of water damage.

For specifications, performance curves and other interesting design details that contribute to long, economical service, send for illustrated Bulletin 720.4.



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Ideas & Methods (Continued)

maining machinery in the desired location in an operating condition. For each construction order then, as well as now, Engineering had to make the design, Air Force approval had to be obtained, and materials procured before the job was sent to the maintenance personnel for completion.

The repair program worked hand in hand with this, since many new parts had to be ordered, as well as a stock of insurance parts to guard against machine breakdown.

As the machine tool program became operable, and as production of parts was begun, a means of quick repair of machinery had to be devised. This was accomplished by setting up a single control point through which were funnelled all requests for repairs of any type, both on machinery and on other types of equipment.

The system of dispatching repairman has been in operation ever since — the emergency calls being dispatched by an industrial radio system. It can easily be seen that because of the nature of machine breakdowns, very few repairs can be scheduled, namely, only those which cannot be immediately effected because of lack of necessary materials.

Adding to the repair problem was the fact that a considerable number of machine tools were of foreign make, since certain American machinery was not available at the time of purchase.

From the beginning, it was to be expected that because of the training of operators, the training of mechanics, and the lack of familiarity with hundreds of different makes of machines, the repair cost would be excessively high. Therefore, from a long range standpoint, a preventive maintenance program was planned. This preventive maintenance program was designed to keep the machines and equipment in better operating condition, to reduce the number of repairs, and consequently to eliminate lost manhours as a result of breakdowns.

Originally the preventive main-

Specify **CONTINENTAL**

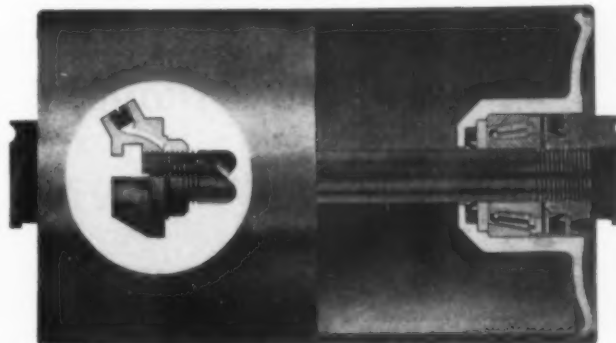
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SUPER CAPACITY



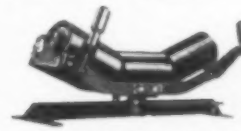
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Continental's Unit-Sealed "UST" Conveyor Idlers are pre-lubricated for longer life and minimum maintenance. Incorporating Timken Bearings and Garlock Klokures this construction permits operating the Continental "UST" Idler without lubrication for 1-2-3 years or more depending on the severity or character of conditions. Write for bulletin SI-116.

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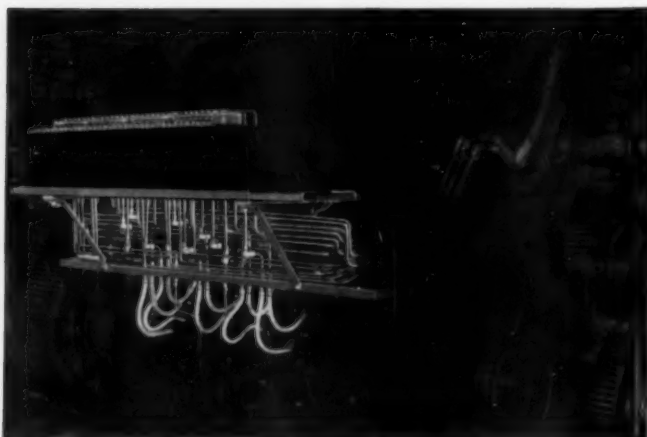
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* Manzel Force Feed Lubricators quickly save their cost by preventing breakdowns due to faulty or forgotten lubrication—by reducing the quantity of lubricants used—and by eliminating the labor of hand oiling. They keep vital parts properly lubricated for uninterrupted production efficiency round the clock.

You can have Manzel Force Feed Lubricators installed on present equipment or engineered into new machinery. Write for information.



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Ideas & Methods (Continued)

tenance program consisted only of lubrication. It has since been expanded to include inspection, adjustments and minor repairs as necessary on all machinery, air conditioning units, elevators, doors, buildings, jacks, aero stands and the overhead crane system. The program itself is scheduled by an Addressograph unit.

Each week, inspection schedules are sent to the various Maintenance Departments showing who is to do the work, where the equipment is located, what is to be done and how much estimated time is to be spent on each piece of equipment.

Records are maintained for every machine (about 3,000 individual records) in the plant, according to Air Force requirements and on all of the above-mentioned items as well, showing the exact cost of material and labor used.

Not only can it be proved when a machine should be replaced, but it can also be proved whether or not maintenance personnel are doing a good job by checking the repair record against the preventive maintenance record. Constant comparison of these records is considered essential.

In a plant the size of Lockheed, the control of costs becomes a paramount factor, and supervision is at somewhat of a disadvantage because of the vast territory their employees must cover. Consequently a cost control system had to be placed in effect and each job, whether repair, construction or preventive maintenance estimated cost-wise before being issued.

The time expended by the men on the job is picked up through a time card system, and comparisons are made by a committee each week of the estimated time against the time actually used.

We have found that a thoroughly planned preventive maintenance system, along with careful control of costs, is the key to better machine operation, fewer machine breakdowns and more productive work by maintenance personnel.

(Continued on Page 86)



Burning coal the modern way saves Clark Equipment \$7,500 a year

Consult an engineering firm

Designing and building hundreds of heating and power installations a year, qualified engineering firms can bring you the latest knowledge of fuel costs and equipment. If you are planning the construction of new heating or power facilities—or the remodeling of an existing installation—one of these concerns will work closely with your own engineering department to effect substantial savings not only in efficiency but in fuel economy over the years.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available • Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar • Automatic coal and ash handling systems can cut your labor cost to a minimum. Coal is the safest fuel to store and use • No smoke or dust problems when coal is burned with modern equipment • Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

Expanding production facilities at Clark Equipment Co., Battle Creek, Mich., created a need for more steam within the plant. In the face of rising overall costs, Clark engineers decided to meet this demand by modernizing the firm's power system.

Today, two watertube boilers utilizing spreader stokers have replaced three firetube boilers, underfeed fired. Stokers are fed by screw conveyor and controls are fully automatic. As a result of these and other aspects of its modernization program, Clark's boiler plant has now increased plant efficiency, supplying reliable, low-cost steam for all purposes—at a savings of \$7,500 a year.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building • Washington 5, D.C.

“... will require
the utmost cooperation
of all of us”

“Our industry has made gigantic strides in the last decade. But, bright as the picture is, there is still a tremendous job to be done. The Live Better Electrically program provides a way to accomplish this job realistically on a national basis. It will require the utmost cooperation of all of us. If we can put this across ... this broad concept of Live Better Electrically ... all segments of our far-flung interests will benefit economically. And, what is more important, the entire nation will be enriched with the opportunity for better living, easier living, happier living.”

How electric utility companies are **LIVE BETTER...**

Today, over 200 electric utility companies are actively participating in the Live Better Electrically program. On February 8, over 80 of these companies sponsored the Live Better Electrically closed-circuit television show and invited their trade allies in 76 cities to attend. On that afternoon in February, the show was seen by an audience (and a selected audience!) of over 30,000 people.

Two hundred kinescope (film) prints of the show have been distributed for later showings by utility companies, and it is estimated that these will have an audience of a quarter of a million viewers.

Many utility companies are already using the Live Better Electrically theme and symbol in their advertising. Some



Harlee Branch,
President, Edison
Electric Institute

backing

Electrically



have used it on their annual report. Reports have been enthusiastic, and demand for advertising materials has exceeded even the most optimistic plans. Some utility companies have revamped their entire advertising schedule in order to make fuller use of the Live Better Electrically theme. Others have bought time on radio and television to identify their company with the Live Better Electrically movement. The success of the Live Better Electrically campaign depends, in great measure, on co-operative effort. These utility companies working for, and getting the cooperation of, trade allies in their local areas will reap the greatest rewards.

HERE ARE THE WAYS YOU CAN ENLIST THE SUPPORT OF YOUR LOCAL TRADE ALLIES

Conduct regular Live Better Electrically sales and information meetings with dealers, contractors, builders and other local trade allies.

Make wide distribution of all Live Better Electrically promotion materials—banners, window streamers, posters, counter cards and direct-mail pieces.

Suggest truck signs, letterheads, business cards, postage-meter slugs incorporating the theme.

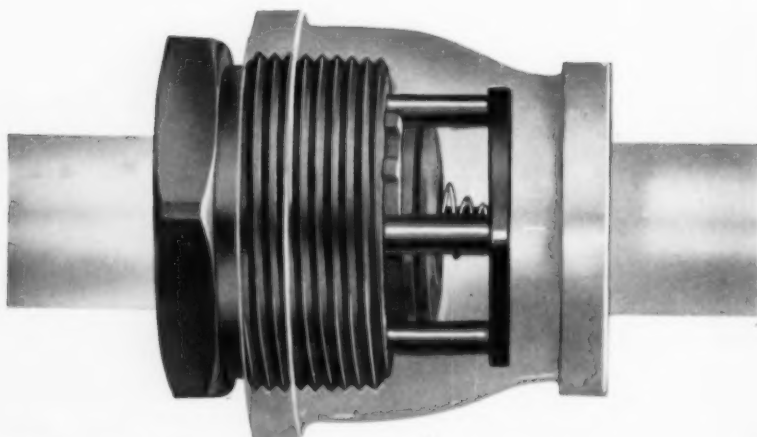
Distribute copies of book "How to Help Home Owners Live Better Electrically" to trade allies.

Supply trade allies with copies of consumer book "Step-by-Step Ideas to help you Live Better Electrically."

Mail copies of 8-page booklet entitled "The Story of Live Better... Electrically" to your trade allies.

Use prepared radio and television commercials on your local stations.

Supply your trade allies with prepared newspaper advertising mats in various sizes.



With this check valve and your imagination you can:

- *Cut inventory—drastically*
- *Reduce costs—substantially*
- *Be ready for any check valve emergency*

By combining a Durabla Basic Check unit with any standard pipe fitting you can make a complete check valve (see right).

These unique check valves, through their interchangeability, reduce inventory sharply. You keep just the basic units on hand, and they're boxed, labeled, and ready for quick installation in any El, Tee, Cross, coupling, tank head or other vessel (such as a "dry can") as each job requires.

Durabla valves cut costs, since all you buy are the working parts. What's more, they operate perfectly in any position. This eliminates stocking of separate vertical and horizontal-operating valves, and permits installation without changes in existing lines, or costly "positioning" in new installations.

Made of stainless steel throughout, their versatility prepares you for any emergency. Durabla Check Valves will handle any liquid, gas or air—at all temperatures. They come in seven standard line sizes from $\frac{3}{8}$ " to 2". Write for details and bulletin SPI 46

DURABLA MANUFACTURING COMPANY
114 Liberty Street • New York 6, New York

DURABLA®



Ideas & Methods (Continued)

All of which, in the final analysis, means quality production, on schedule, at competitive cost.

By L. B. BURDETT, Supt., Plant Engineering Control Group, Lockheed Aircraft Corporation, Marietta, Ga.

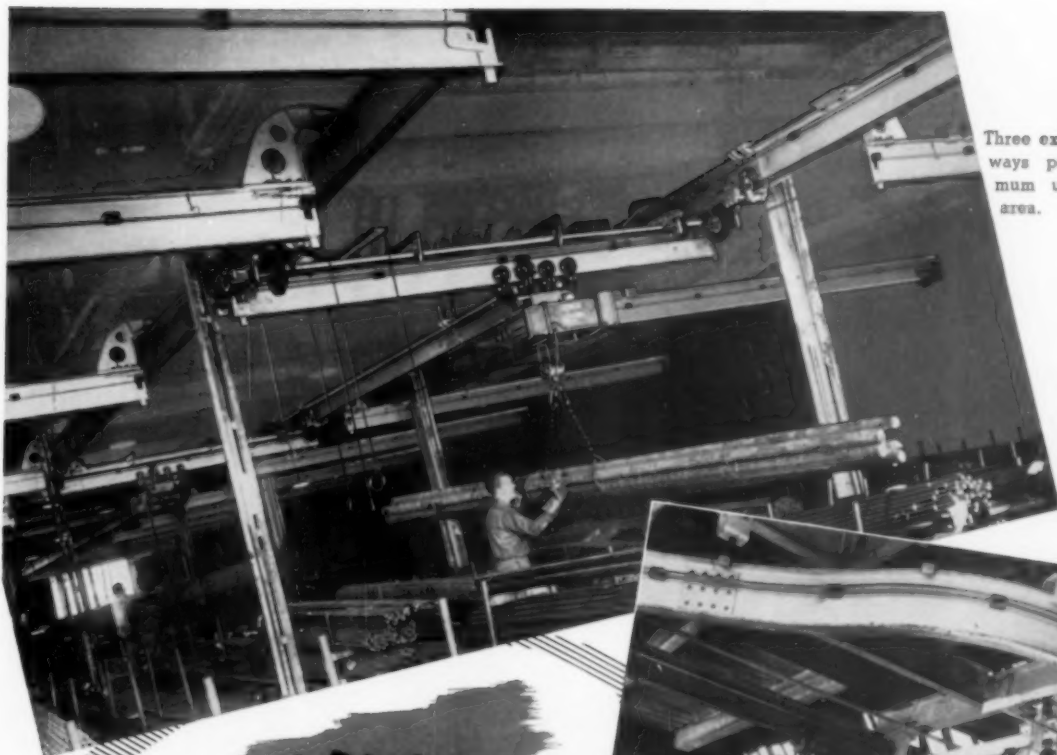
2400 Volt Bus Problem

WE HAD an unusual problem of mating the distribution bus to the generator control bus in our plant. Rather than offset the bus and keep the spacings identical, we installed varnished cambric, rubber and scotch electrical tape which permitted closer spacing of the center bus. Installation was simpler and more economical.



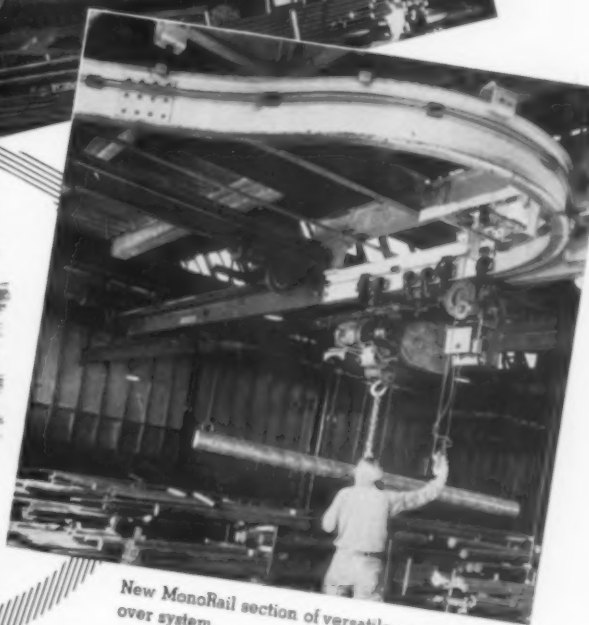
In addition, we painted bolted bus sections with a low-priced aluminum paint which will discolor if the connections ever become overheated and will show need for bolt tightening to lower copper resistance at the junction points.

L. W. FITZPATRICK,
Jefferson City, Mo.



Three existing crane-ways permit maximum use of floor area.

new
MONORAIL
 ties into old...
 for flexible system



New MonoRail section of versatile up-and-over system.

A newly engineered section was added to three existing MonoRail crane-ways in this bar stock warehouse. As a result, incoming material can be picked up from a car and transported on this highly efficient overhead system to storage area. When the raw stock is needed, this up-and-over system has it there on schedule. If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you answer it.

Member of Materials Handling Institute - MonoRail Association

Photos courtesy of Super Steels, Inc., Chicago, Ill.



AMERICAN

OVERHEAD
HANDLING
EQUIPMENT

MonoRail COMPANY

13105 ATHENS AVENUE
CLEVELAND 7, OHIO



IT PUTS THE
SQUEEZE
ON PUMPING

MOTORPUMP

When you compare the Motorpump with any other pump ... feature by feature ... size by size ... you'll quickly see why it is out in front for all liquid handling applications.

Installing it gives you *proof*. For one thing, you'll generally find you can use a *smaller* Motorpump to do the work assigned to pumps of larger horsepower. So costs are lower.

- Moreover, Motorpumps are so compact and efficiently designed that you save space and reduce power consumption. Installation is also simplified because they can be mounted in *any* position—on floor, wall or equipment—with no foundation needed!

Get to know the I-R Motorpump line—ranging in size from $\frac{1}{4}$ to 75 hp, 5 to 2800 gpm with heads to 650 feet.

Send for latest bulletin giving full data needed to choose a Motorpump.



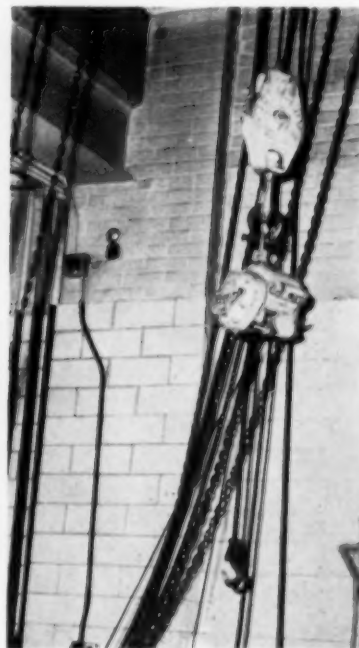
Ingersoll-Rand
9-367 11 Broadway, New York 4, N. Y.



Ideas & Methods (Continued)

Cut Hoist Damage

MAINTENANCE expenses on our small electric hoists seemed to be rather high. We noted careless handling in the tool room and dragging back and forth from the job site.



We now minimize the expense by keeping our smaller hoists on the house crane. The strain is off the motor, chains keep free, and the unit is always ready for operation.

When necessary, we move the large crane into position as a "sky-hook" and the speedy small-fry hoist permits faster light lifts.

By L. W. FITZPATRICK
Jefferson City, Mo.

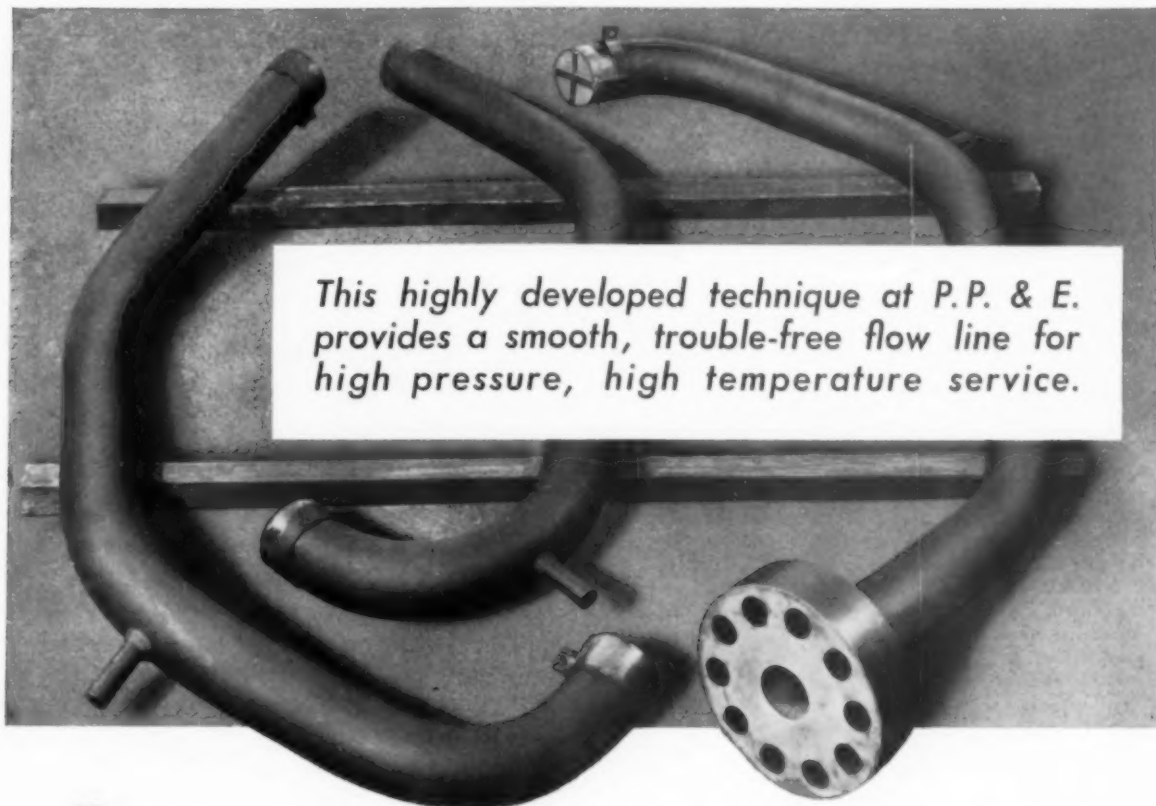
KEEP UP-TO-DATE

USE SPI

READER SERVICE

See Pages 16-19

Hot Bending at *Pittsburgh Piping*



This highly developed technique at P.P. & E. provides a smooth, trouble-free flow line for high pressure, high temperature service.

Bending heavy wall piping is an art which provides a pipe line having best flow characteristics, with turbulence held to a minimum.

Pipe bending saves fabricating time and material . . . permits designing the pipe line to fit exactly into available space. There are fewer welds in the completed system, and field welding can be confined to areas least subject to high stress. Pipe and bends are

of the same material . . . and, as produced at P.P.&E., wall thickness and metallurgical and mechanical properties are consistent throughout the fabricated assembly.

Comparatively few men are qualified by training, experience and skill to bend pipe for high pressure, high temperature service . . . fewer plants have the necessary facilities. P.P.&E. has both the men and facilities.

PRODUCTS AND SERVICES

Carbon Steel Piping	Forged Piping Materials
Cast Iron Fittings	Headers
Cast Steel Fittings	Manifolds
Chrome-Moly Piping	Pipe Bends
Copper Piping	Stainless Steel Piping
Corrugated Piping	Van Storing
Crescent Bends	Welded Assemblies
Expansion Bends	Welded Stainless Steel Tubing
Flanges	Welding Fittings

Pittsburgh Piping
AND EQUIPMENT COMPANY

158 49th Street — Pittsburgh, Penna.

CANADA: CANADIAN PITTSBURGH PIPING, LTD.
835 BEACH ROAD—HAMILTON, ONTARIO

OFFICES IN PRINCIPAL CITIES

Atlanta	Whitehead Building
Boston	10 High Street
Chicago	Remley Gas Building
Cleveland	Public Square Building
Houston	Height State Bank Building
Los Angeles	1830 North Alexandria Ave.
New Orleans	P. O. Box 74
New York	Woolworth Building
Sprague	112 So. Salina Street
Toronto	66 Yonge Street
Washington	Wire Building

Equipment . . . Supplies . . . Methods

FOR FREE INFORMATION — Circle Code Number on Page 17 Return Card

Remote Control of Traveling Cranes

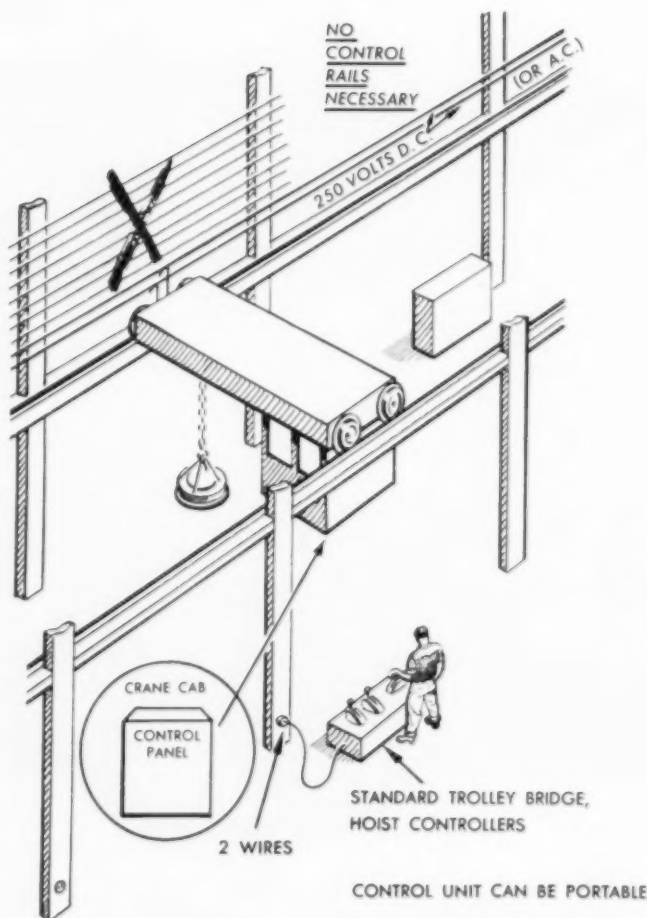
D-1 A new electronic system to provide remote control of traveling cranes from the plant floor, has been developed by Femco, Inc., Irwin, Pa.

As carrier current over existing power rails is the only circuit required, installation is simple for any crane or similar device now in use or in new construction. No additional power rails are required.

With the new control, an operator can raise or lower the hoist (5 positions), position the trolley forward or reverse (5 positions), travel forward or reverse (3 positions) and can energize or turn off the magnet, all from the floor. As many as eight cranes can be controlled on one power circuit by use of different carrier frequencies and one operator can operate more than one crane. By use of two control panels, a crane can be loaded by one man and then sent to the other end of its runway where another man can unload it and send it back.

In operation, high-speed synchronous relays on crane and floor panel operate whenever levers are moved. Carrier frequency on each step is shifted down to a lower frequency for an OFF control and up to a higher frequency for an ON control. Whatever control is sent during one operating cycle is stored by a "sealing-in" relay until changed by another operating cycle. The small relays which operate in a few milliseconds are repeated by contactor type relays for the actual control. An emergency stop switch is provided to cut off the carrier and open the control contactors if the relay system or carrier link should fail at any time.

The floor control panel may be in a permanent location or may be placed on a cart for portability from one to another power receptacle.



PVC Plastic Pipe

D-2 The Alloy Tube Division of The Carpenter Steel Company, Union, N. J., is now marketing rigid unplasticized PVC (polyvinyl chloride) pipe.

These represent the first non-metallic products ever supplied by

the Division, which has been producing a wide range of stainless steel tubing and pipe for over 28 years.

The Division is offering two types of PVC . . . a normal impact grade with high chemical resistance, and a high impact grade with slightly less chemical resistance but much

greater strength. They are designated Carpenter PVC No. 1 and Carpenter PVC No. 2, respectively. Threaded and socket types of fittings are available.

Both types of PVC are easily fabricated on standard metal and woodworking equipment. They can be formed, sawed, threaded, ma-



IDENTIFICATION DISC: An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.



NEWLY DESIGNED HANDWHEEL: Patented air-cooled, finger-fit handwheel affords sure grip even with greasy gloves.



IMPROVED PACKING: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure when fully opened.

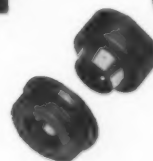
note these 7 Great Features



HEXAGONAL UNION BONNET CONNECTION: Union bonnet connection eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.



OVERSIZE STEM: The high-tensile strength silicon-bronze stem assures long life and protection against wear.



SEATS AND DISCS: Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirror-like finish, with accurate tapers assures tight positive shut-off with minimum handwheel effort.



EXTRA STRONG BODY: Made of Composition M (ASTM B61) bronze. Thick walls and rugged hexes provide a high safety factor. Valves undergo hydrostatic shell test of 1,200 psi.



take a good look
at the Walworth
"500 Brinell"
no. 225P Globe

- the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinell — hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes 1/4" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.

WALWORTH
valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

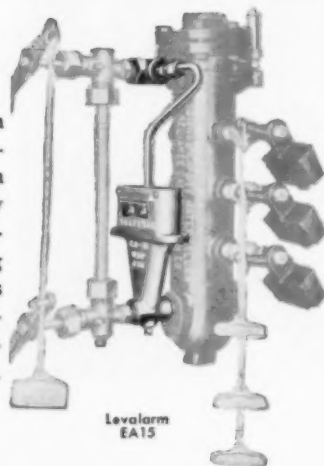
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Tiny currents guard boiler safety

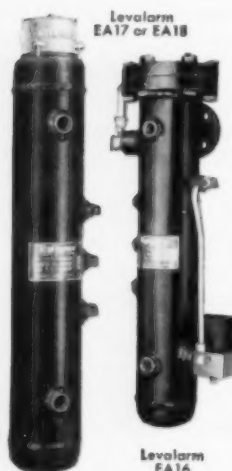
You can operate alarms, fuel cut-out, start and stop pumps safely and accurately with

Reliance Levalarms®

Now you can protect any boiler, from lowest pressures to 2500 psi, with a completely electrical fast-acting alarm system and other controls. Actuated by a tiny current — 25 milliamperes or less — relays pick up signals through the opening or closing of isolated electrode circuits installed on or in the boiler water column. Levalarms are unaffected by pressure, temperature or water conditions.



Levalarm
EA15



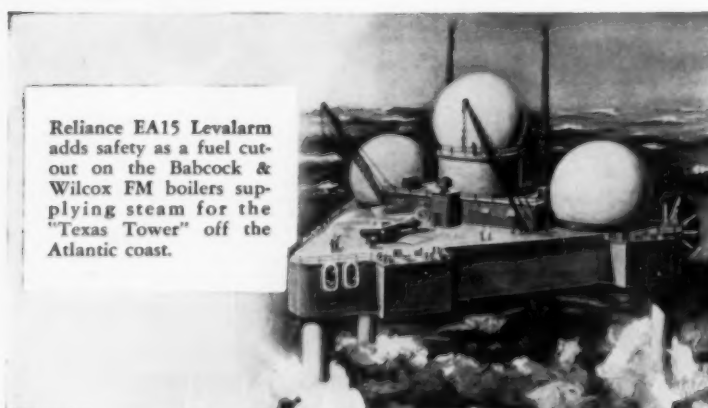
Levalarm
EA17 or EA18

Levalarm
EA16

Low alarm or high alarm or both, fuel cut-out, and starting and stopping of pumps thus are affected with the speed of electricity *within a small fraction of an inch* change of the boiler water level at predetermined safety points.

The simplest of four Levalarm models, shown above, is a fuel cut-out on a water column. Other variations are for higher pressures and wider variation of control combinations. For the full story about these new Levalarms, write for Bulletin D2.

The Reliance Gauge Column Company
5902 Carnegie Ave. Cleveland 3, Ohio



Reliance EA15 Levalarm adds safety as a fuel cut-out on the Babcock & Wilcox FM boilers supplying steam for the "Texas Tower" off the Atlantic coast.

The name that introduced safety water columns.... in 1884

Reliance®

BOILER SAFETY DEVICES

Equipment, Supplies & Methods (Continued)

chined, hot gas welded and solvent cemented. Installation is simple and inexpensive.

The materials are only one-half the weight of aluminum, and one-sixth the weight of steel. Aging characteristics are said to be outstanding. Both types are said to be non-toxic, odorless, tasteless, non-porous, non-contaminating, abrasion resistant and non-flammable. Friction loss is about one-half that of steel. Both are non-electrolytic and make excellent electrical insulating materials.

PVC pipe is available in Schedules 40 and 80 in nominal sizes ranging from 1/4" to 4". All pipe is furnished in standard 10 and 20 ft lengths with plain ends.

Applications are recommended for the following industries: aircraft; beverage; brewery, winery and distillery; citrus; chemical process; dairy; electrical; fertilizer; food process; marine; metal finishing; mining and smelting; oil and gas; pulp and paper; refrigeration; tanning; and textile.

For More Free Data **CIRCLE CODE NO.**
on the Handy Return Card — Page 17

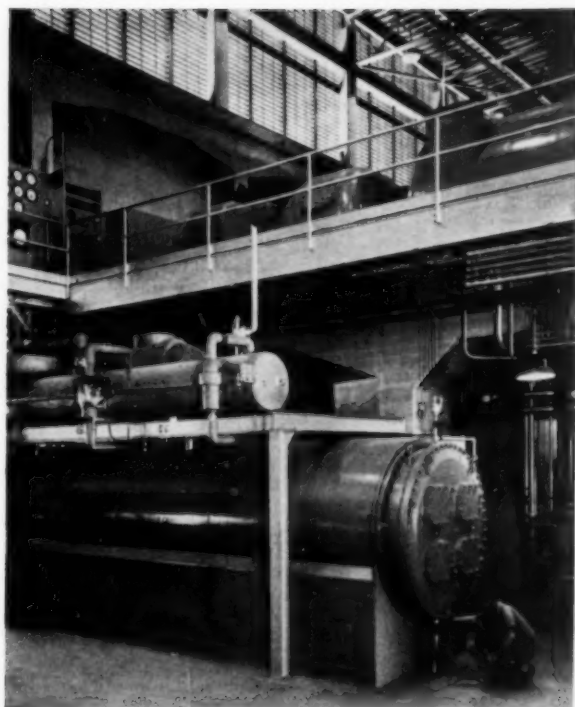
Water Softeners as Packaged Units

D-3

Water softeners for manufacturing plants and institutions are being sold as package units by **Hagan Corporation**, 323 Fourth Ave., Pittsburgh 22, Penna., so that only simple connections, requiring a minimum of installation time, are needed to fit a unit into a water system.

Each unit consists of a brine tank and a softener tank, with their controls and piping in place. Twin units, which include two softener tanks with a single brine tank, also are available. With a "twin," one tank is always on the line to supply soft water while the other is being regenerated.

Flow rates can be as high as 175 gpm for a single unit, or 350 for a twin, with capacities between regenerations ranging up to 1,500,000 grains for a single unit and 3,000,000



One of 28 Worthington condensers serving 20,000 kw turbine generator units in a southern aluminum plant. Each unit has twin 9300 sq. ft. shells, tee-connected.



100,000 sq. ft. low-headroom oval-type Worthington condenser. One of five units serving 215,000 kw turbine generators at the largest power plant in Ohio.

Name the job... Name the space... WORTHINGTON has the condenser!

Worthington builds condensers in all sizes to meet any reasonable space requirement. A design exclusive... the Double Folded Tube Layer... enables Worthington to "tailor" a condenser to available space, reducing cost of foundation and building construction. Most headroom limitations are easily met. The Double Folded Tube Layer design is adaptable to almost any shape of condenser shell, without sacrificing efficient performance. Worth-

ington offers a variety of arrangements including oval or rectangular single shell units, side mounted shells with exhaust elbow, twin shells with side or tee-piece exhaust connections, and special designs for "axial-flow" exhaust turbines. Worthington can meet your needs quickly and economically.

Contact your nearest Worthington District Office or write: Worthington Corporation, A&SP- Steam Power, Harrison, N. J.

WORTHINGTON

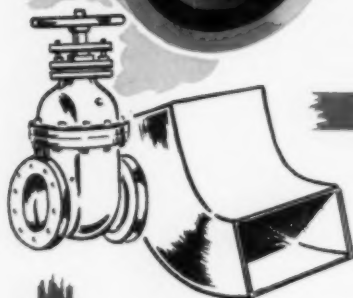


STEAM-JET EJECTORS • VACUUM PUMPS • BOILER FEED PUMPS • FEEDWATER DEAERATORS • SURFACE CONDENSERS and AUXILIARIES • STEAM TURBINES

PROTECTION against Corrosion and Abrasion!



for PIPES...
VALVES...
TANKS...DUCTS
...VESSELS...etc.



Rubber,
Neoprene
and Polyvinyl Chloride
**LININGS &
COATINGS**

Are you handling acids, bases, salts or other hard-to-handle chemicals or fumes in your production? We coat pipe-lines, tanks, valves, ducts, etc., for longer, more efficient operation. Compounds can be made conductive or non-conductive, soft or hard, suitable for high or low temperature operations.

Long-established Southern Company now offers you speedier service, lower transportation costs, important savings in your maintenance and new installations involving such specialized equipment. Our highly skilled personnel and newest production techniques can increase your plant efficiency.



Write, wire or phone for
full information or immediate service

RADIATOR SPECIALTY CO.
1400 West Independence Blvd. Phone EDison 3-3131
CHARLOTTE, NORTH CAROLINA

Equipment, Supplies & Methods (Continued)

grains for a twin. A typical "hard water" may contain from 5 to 15 grains per gallon.

In the softener tank, the exchange material rests over a bed of gravel. As raw water passes through the tank, the calcium and magnesium salts, which cause "hardness," combine with the exchange material, so that the water that leaves the tank is softened. When the resin becomes saturated, it can be regenerated quickly by use of an ordinary salt solution, drawn from the brine tank into the softener tank.

Each softener tank is equipped with a simple but effective backwash automatic controller that accurately maintains the correct flow of water through the unit during backwash, preventing loss of resin, but insuring sufficient flow for adequate cleansing of the exchange material.

Fine slot, non-clogging distributors made of brass are mounted near the bottom of the tank. By their construction and placement they insure even flow of water and prevent loss of resin. A positive-seating multiport valve and two pressure gauges are also included in the equipment of each softener tank.

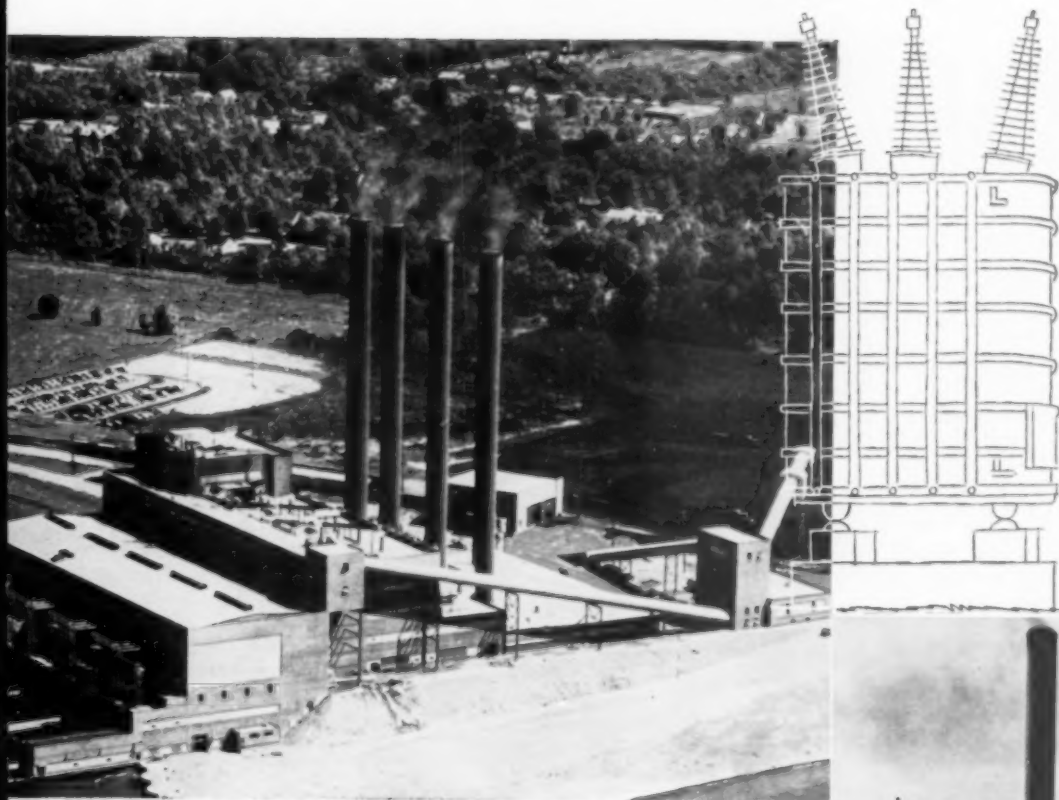
Angle Vise with Swivel Base

Accurate setups at any angle can be made without use of clamps, wedges, or other makeshift methods with the new Palmgren No. 23B Angle Vise with swivel base, manufactured by the **Chicago Tool and Engineering Co.**, 8383 South Chicago Ave., Chicago 17, Illinois.

The No. 23B has 3" jaw width, 3"



MORE POWER (HOUSES) TO YOU



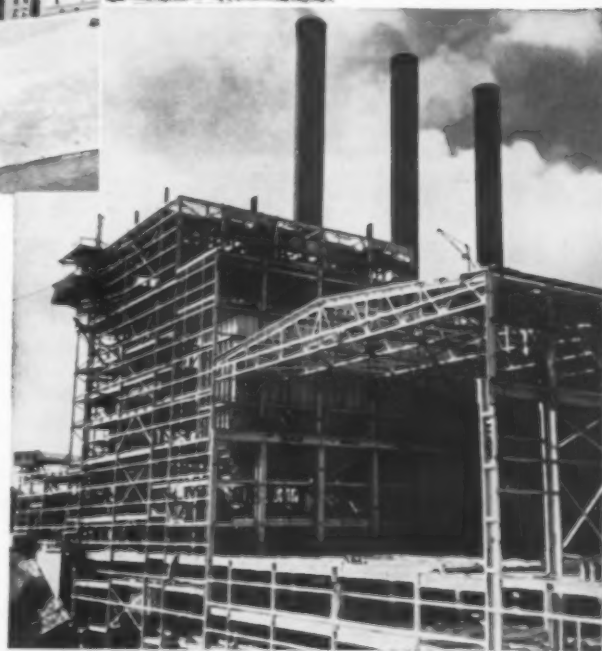
The Phenomenal Growth of the utility field is vividly reflected in the vast number of new power houses which will more and more come to encompass nuclear power as well as electricity.

Ingalls is the largest independent fabricator of structural steel in the country for power houses. So it is with pride we point to the "more and better" power houses of 1956.

Currently, Ingalls is working on fifteen jobs of this nature.

A recently completed job for which Ingalls supplied the structural steel is the #4 unit of The Cleveland Electric Illuminating Company's Eastlake Power Plant shown here. When this 240,000-kilowatt giant goes into operation early this year, it, and the three 140,000-kilowatt turbogenerators now in service, will generate enough electricity to light nearly a million homes.

If you are contemplating a new power house, or an addition to your present power houses, Ingalls offers you its service—fabricated steel, steel erection, or both. Your inquiries are invited.



**FABRICATING
STEEL IS
OUR BUSINESS**



IRON WORKS COMPANY
BIRMINGHAM, ALABAMA

SALES OFFICES: New York, Chicago, Pittsburgh, Houston, Atlanta, New Orleans

PLANTS: Birmingham, Ala.; Verona, Pa.; Pascagoula, Miss.; North Birmingham, Ala.; Decatur, Ala.

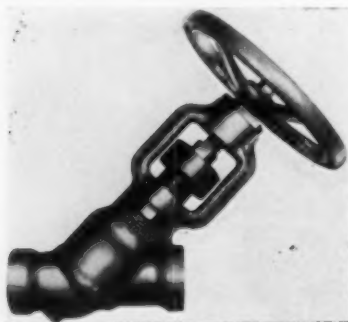
Equipment, Supplies & Methods (Continued)

jaw opening, and 1 1/4" jaw depth. It can be used with or without the 360° graduated Swivel Base, and can be set at any angle from 0° to 90° in a vertical plane — also can be used as an ordinary machine vise in the horizontal position. The No. 23B is accurately graduated and ready for instant use by locking the adjustable support screws.

Valves for High Pressure & High Temperature Service

D-5 Yarway "Welbond" Valves for high pressure, high temperature service; by Yarnall-Waring Co., Philadelphia 18, Penna., are recommended for general boiler room use including drain service on water wall headers, economizers, water columns and gages; drain and vent services on superheaters and steam lines; shut-off service on sampling lines, bypasses, water gages, water columns and instruments. "Welbond" valves feature a compact design and materials selected to resist the rigors of high pressure, high temperature service.

The integral seat of heavy stellite is welded on the seat nozzle and finished before the nozzle is welded to the body. An annular groove absorbs thermal changes near the



seat, prevents distortion during assembly welding, and permits a positive seal when the valve is closed. For easy maintenance, all working parts are readily removed through the yoke. Welbond Valves are available in seven sizes from 1/4" to 2 1/2", angle and straightway patterns, socket weld ends, and for pressures, 1,500 and 2,500 psi at 1050 F.

Plug-in Adapter for Clamp Volt-Ammeter

D-6 A new plug-in Adapter which greatly extends the use of the Weston Model 749 Miniature a-c Clamp Volt-Ammeter has just been introduced by the Weston Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N. J.



This compact adapter has plug receptacles on either side; one of which reduces the scale range of the Model 749 by a factor of 10, permitting low current measurements. The receptacle on the other side is for reading the ampere scale directly (1:1).

For measuring the current consumption of motors, appliances and circuits, the adapter is plugged into the a-c line, the appliance connected to the adapter, and the clamping jaws of the instrument inserted through the adapter opening. Voltage readings also are quickly made simply by plugging the probes of the Model 749 into the plug receptacles on either side.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Chemical Resistant Maintenance Material

D-7 A labor-saving, low-cost solution to the industrial problem of maintaining and upgrading wood, metal and masonry surfaces has been announced by The Glidden Company, Cleveland, Ohio with the introduction of a new, 100% solids resin coating, named Glid-Iron.

In addition to having excellent adhesion to wood, metal and concrete,

Glid-Iron is highly resistant to chemicals, thus making it ideal as a floor coating in fruit processing plants, canneries, dairies, plating and chemical plants, and machine shop areas where the spillage of chemicals and oils is common.

The new coating offers substantial savings with Glid-Iron application cost set at 15 to 19 cents per square foot, compared with other methods that range up to 35 cents per square foot.

Glid-Iron may be applied by spray, brush, roller or squeegee in any film thickness, 1/16 to 1/2 in. if desired. Application time for a 10 x 40 ft area is 20 to 30 minutes with an undercoating gun, and two to four man hours by other application methods.

Capable of smoothing out and bridging small cracks, the new coating sets to a hard, tough, flexible and scuff resistant finish after curing overnight at normal room temperatures.

The new Glidden product possesses outstanding resistance to shock and impact, showing no adverse effects from the extremely heavy weights and rough abuse caused by materials handling lift trucks and other such mechanized equipment.

Glidden research technicians report Glid-Iron will withstand extreme temperature ranges—from 20 degrees below zero up to 212 F. Additionally, the floor coating is skid-proof even when wet, and nails may be driven through the film without it chipping. Glid-Iron may be supplied in any color.

Headerless Type Steam Generator

D-8 New field erected headerless type steam generators of capacities ranging from 50,000 to 150,000 lb/hr have been announced by Springfield Boiler Co., Springfield, Ill.

Units are highly efficient and can be built for either pressurized or balanced draft firing. Heat recovery for higher efficiencies and superheat equipment can be provided as desired. Superheater headers and steam temperature control lines are on the outside of the unit for ready access and are drainable.

Design consists of a two-drum, bottom supported boiler with completely water cooled furnace having tangent tube spacing on bottom, both sides and roof, and a wider tube

FOR YOUR TOUGHEST WELDING PROBLEMS

EUTECTIC WELDING

ALLOYS CORPORATION



650 EUTECTIC PERSONNEL PROVIDE REAL WELDING HELP

The people in the photo above supervise several hundred metallurgists, chemists, engineers, production and customer service personnel at Eutectic's Flushing, New York plant, research laboratories, and administration building. Through Eutectic's District Engineers and Authorized Representatives, they provide you with the latest technical information on metal joining, and the most advanced welding alloys.

But, you can get this unique service only from a Eutectic representative because only he is a direct link with Eutectic research and production. Your Eutectic representative brings to your shop all the experience gathered by the more than 350 Eutectic representatives. From strategically located, local shipping points, they bring you all the advantages

of Eutectic's famous "Low Heat Input" metal joining process... the modern method that minimizes stress, warping, embrittlement and other damage to base metals caused by the high heat of conventional welding materials.

Take advantage of this direct source of greater profits from welding. Let your Eutectic representative give you a free demonstration in your shop, on your materials. Phone your nearest source of Eutectic service today.



FREE — new 16 page Eutectic Welder Magazine. Read actual case histories of time and money savings on maintenance and repair. Learn the welding procedures for perfect salvage jobs not possible with conventional welding materials.

Write for your copy today.



EUTECTIC WELDING ALLOYS CORPORATION

172nd Street and Northern Boulevard, Flushing 58, N. Y.

Service Centers in Chicago, Atlanta, Montreal

Equipment, Supplies & Methods (Continued)

spacing as required in the front wall to permit burner installation with a tile backed-up target wall opposite the burners. This target wall is tube cooled with wall tube spacing arranged so that these tubes form a furnace screen ahead of the superheater.

The design employs no waterwall and no boiler headers. Water-steam friction losses are reduced to less than one-quarter of that of conventional designs. Thus, virtually all of the hydrostatic head is available to support rapid circulation through tubes. Such rapid circulation adds greatly to the washing and cleaning effect that high velocity water provides inside of the waterwall and boiler tubes.

Installations are completely self-

draining, including boiler, waterwall, economizer and superheater tubes. Units can be provided with steam temperature control of either the submerged heat exchanger type or the spray type.

The separation of pressure parts from setting enclosure and the employment of scientifically developed tube joints with a specific grooving and tube seat depth on the water side of the drums, together with the continuous tube design, make this type generator a quick starter and a quick steamer.

Elimination of all headers, with consequent elimination of many tube joints and handhole openings, makes this type unit suitable for quick chemical cleaning.

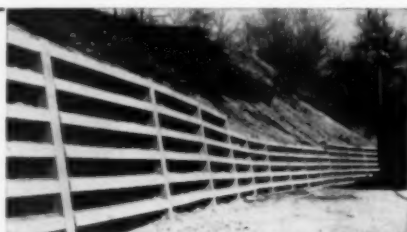
ARMCO RETAINING WALLS

- Stabilize Slopes
- Gain Valuable Land

Armco Bin-Type Retaining Walls provide an efficient and economical solution to earth control problems. They stabilize steep slopes and gain land for buildings, railroad sidings, roads or parking areas.

Bin-type all-metal cellular construction provides flexible strength. Earth fill gives the necessary weight and stability. All-bolted assembly means small crews can do the work—without special equipment.

This Armco Retaining Wall was installed by a famous Milwaukee brewer to stabilize a slope and make room for an additional railroad siding.



On a sloping lot of the Emerson Truck & Storage Company, Inc., Battlecreek, Michigan, an Armco Wall provides a level area for parking trucks and equipment.

One set of tracks at the Wausau Paper Mills, Brokaw, Wisconsin, had to enter the plant 16 feet higher than the lower siding. An Armco Bin Wall solved the problem.



Armco Walls are supplied in a wide range of sizes. Write for data.

ARMCO DRAINAGE & METAL PRODUCTS, INC.

DIXIE DIVISION

619 Forsyth Bldg. • Atlanta, Georgia

SOUTHWESTERN DIVISION

C & I Life Bldg. • Houston, Texas

Other Offices in Principal Cities



For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 17

Redesigned Gate Valve

D-9 Crane Company, Chicago 5, Ill. has redesigned and is marketing its No. 430, 125 lb brass rising stem double wedge disc gate valve. The valve is recommended for general service on steam, water, oil or gas lines. It comes in sizes ranging from ¼" through 3".

The new design complements its companion valve, the redesigned No. 428, 125 lb rising stem solid wedge brass gate valve and the modernized No. 438, 125 lb and No. 437, 150 lb non-rising brass gate valves.

The body neck in the new design is cylindrical. The design offers maximum strength in the body structure thus eliminating the need for massive wall sections.

It affords a compact, relatively lightweight valve, yet ideal for resisting internal pressures. The cylindrical reinforces the seat area against the wedging of the disc and safeguards against distortion of the body in seating the disc.

Sizes ½" and larger are fitted with the double wedge type disc; sizes ¼" and ¾" have solid wedge discs. All sizes feature the slip-on type disc-stem connection.

Valves ¾" and larger have a stuffing box gland, while sizes ½" and smaller have none.

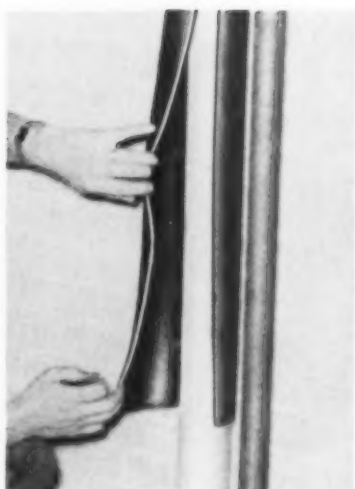
Equipment, Supplies & Methods (Continued)

New "Wire-Wrap" Tool For 14 and 16 Gage Wire

D-10 A new "Wire-Wrap" tool of Keller Tool Division of Gardner-Denver Company, Grand Haven, Mich. will make solderless wrapped electrical connections with 14 and 16 gage wire.

Powered by the Keller Air Motor, the new tool makes connections in less than one second. Any solid 14 or 16 gage wire may be used with the tool. Terminals may be made from commonly used metals and may be square or rectangular. The maximum terminal dimensions are .132 x .132 in. with a minimum .375-in. spacing between terminals. Each connection is 11/32 in. long.

The tool weighs 2 lb and may be fitted with either a straight or offset pistol-grip handle. An automatic device stops the bit in the correct starting position.



staples, using an ordinary stapler. Installation is simple, requiring no cutting, measuring, pasting or wiring. Circumferential seams are sealed quickly with Pip-Jac adhesive tape. Fittings are protected by coating with special Pic-Jac adhesive tape. One man can completely jacket more

KEEP UP-TO-DATE

- Ideas
- Methods
- Equipment

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READER SERVICE

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Pages 17 & 18

than 200 lineal feet of line in 8 hours. Furnished in black for exterior use, or decorator gray for interior use.

Industries which find it necessary to periodically shift or relocate insulated pipe lines will find an additional advantage, since the original Pip-Jac can be easily removed and used in the new location, thus saving costs of new material.

Pipe Insulation Jacketing

D-11 A development in pipe insulation jacketing for the protection of hot or cold insulated lines has been announced by Pip-Jac Company, 295 Beverly Rd., Pittsburgh 16, Pa. Ease of handling is one of its chief advantages.

Pip-Jac (pronounced "Pipe-Jack") is preformed polyethylene. It resists damage from heavy blows such as would be caused by equipment and ladders, and will not chip, flake, rust or corrode. It will not take the contours of wrapping material on wrapped lines. No painting is necessary, and it will never become brittle thus assuring lifetime service, free of maintenance.

One of the chief advantages of Pip-Jac is its ease of handling. Precut to 6 ft lengths and preformed to correct diameters, Pip-Jac is merely fitted around the insulation, after which it springs shut by itself. Longitudinal seams are fastened with

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KEN KENNEDY SAYS:
I'M READY TO SERVE YOU AT OUR
NEW INDUSTRIAL SOUTH ADDRESS

KENNEDY VALVE MFG. CO.
SOUTHERN BONDED WAREHOUSE
ATLANTA 2, GEORGIA
TELEPHONE, LAMAR 3421



One of the oldest makers of QUALITY VALVES now provides complete warehouse service in the Industrial South. Whatever your requirements in valves . . . Brass Valves, Iron-Body Valves, A. W. W. A. Valves, Underwriters'-Approved Valves . . . call KENNEDY FIRST for the finest in valves and the fastest in service.

Distributors are invited to write direct concerning open territories.

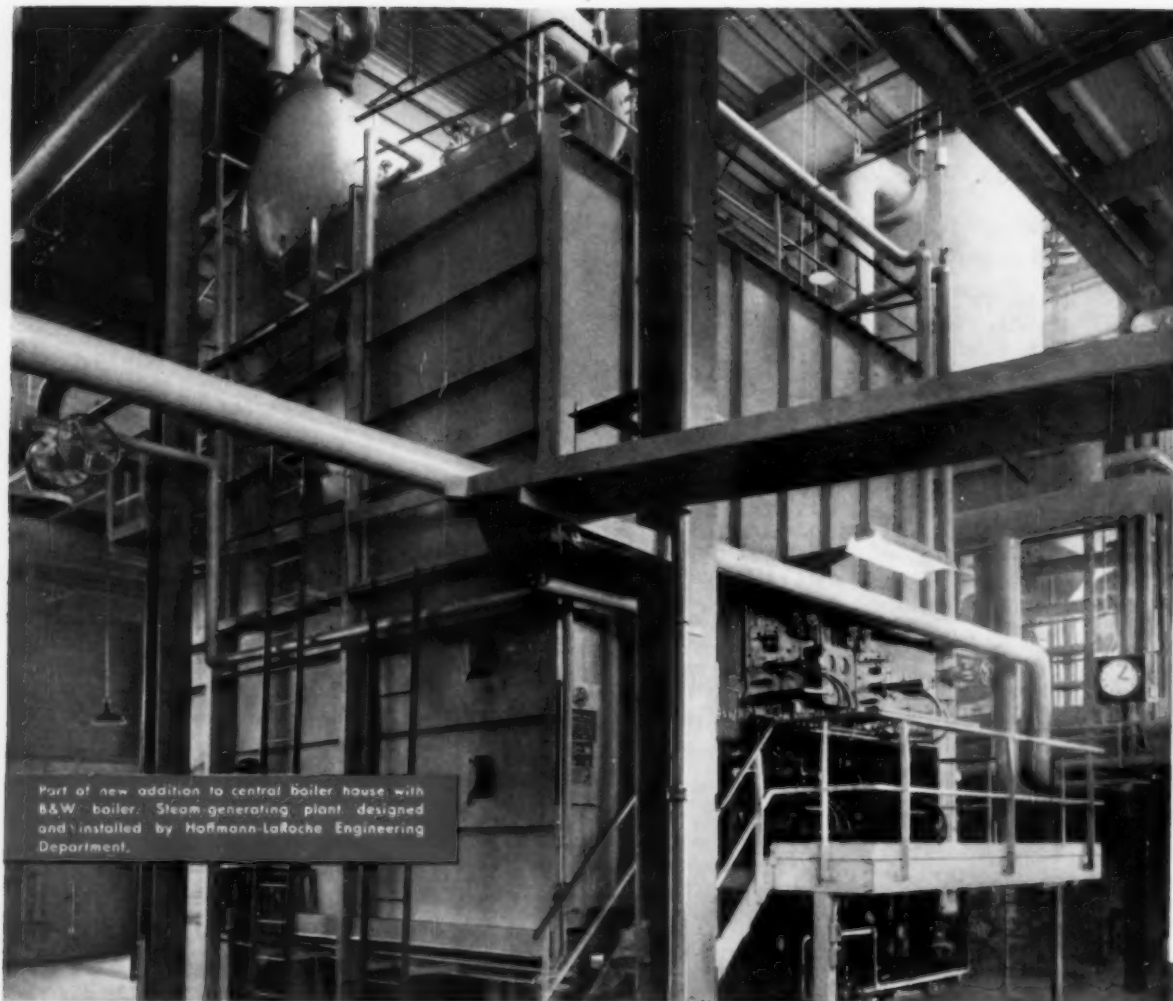


THE KENNEDY VALVE MFG. CO. • ELMIRA, N. Y.

VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE AND WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO, ATLANTA, SALES REPRESENTATIVES IN PRINCIPAL CITIES

For More Free Data CIRCLE CODE NO.
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Part of new addition to central boiler house with B&W boiler. Steam-generating plant designed and installed by Hoffmann-LaRoche Engineering Department.

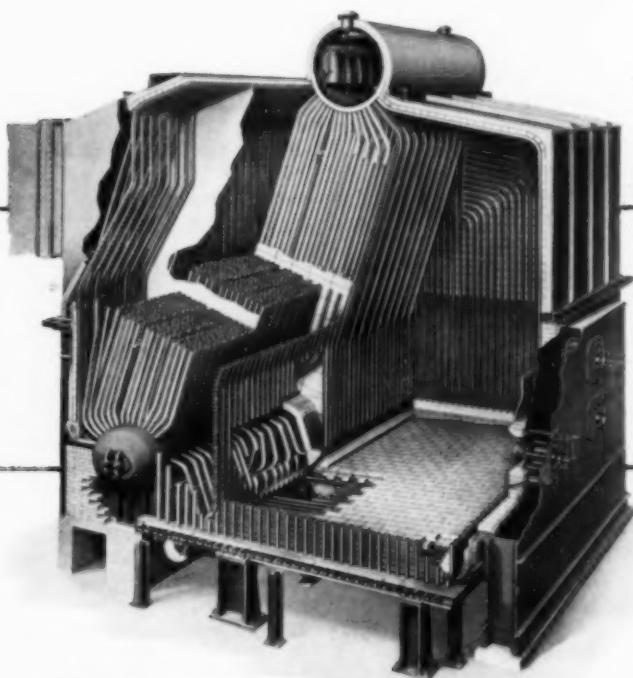
B&W FP BOILER HELPS **Hoffmann-La Roche** **SOLVE SPACE AND STEAM PROBLEMS**

Spotless housekeeping, noticeable throughout Hoffmann-LaRoche's pharmaceutical plant, extends even into the new addition to the central boiler plant at Roche Park in Nutley, New Jersey.

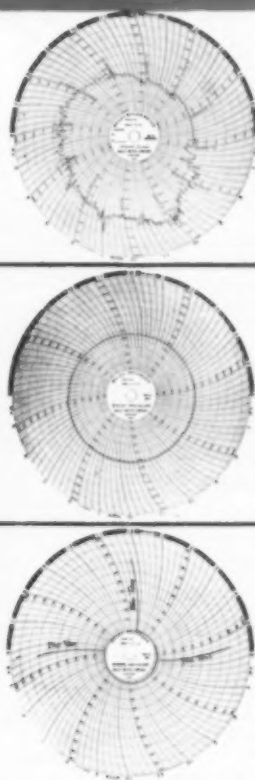
A new B&W Integral-Furnace Boiler replaces four older, smaller and less efficient boilers, now on standby in another boiler room. This centralization of steam generation permits the company to more surely plan the use of that valuable space for expanding production facilities. The new boiler is oil-fired and has a design capacity of 75,000 lb. of steam per hr. The unit has a completely water-

cooled furnace that provides durability and eliminates maintenance common to furnaces having considerable exposed refractory.

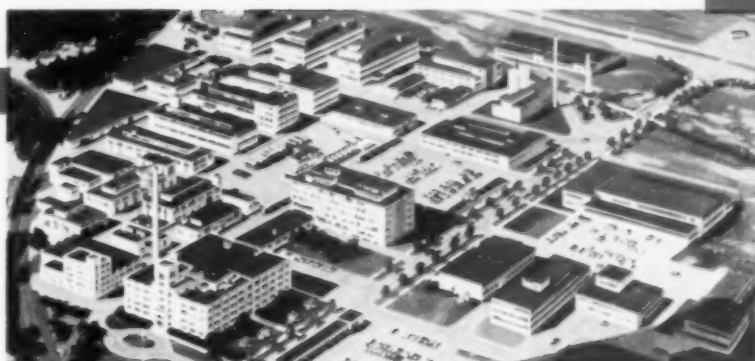
Choice of this B&W Integral-Furnace Boiler, as part of Hoffmann-LaRoche's continuing modernization program, was the result of careful weighing of all factors involved in the heating and processing operations. The program required additional dependable steam on tap in sufficient quantities at all times. Then, too, wide load swings have to be handled smoothly and economically. The B&W Boiler does this under complete auto-



Sectional view of B&W Integral-Furnace Boiler Type FP.



Steam flow, pressure, and smoke charts indicate handling of variable loads at constant pressure with a clean stack.



matic control, providing peak efficiency over the load range. An indication of the quick response and flexibility of the boiler in handling the load swings is indicated by the charts.

Like so many other companies of all kinds, where steam is required — for processing, heating, hot water, air conditioning — Hoffmann-LaRoche has selected an efficient B&W Boiler that precisely meets its needs for reliable, economical steam, and is backed by a policy of reputable service that assures complete satisfaction. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.



G-770

Catawissa

PERFECT SEAL

Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

**A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!**



**Standard & Double
Extra Heavy
UNIONS**

Available with screwed or socket weld ends. 3000-lb. sizes $\frac{1}{8}$ " to 3"; 6000-lb. sizes $\frac{1}{8}$ " to 2".



**ORIFICE
UNIONS**

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

**MALE & FEMALE
UNIONS**

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



**FULL STAINLESS &
FULL ALLOY
STEEL UNIONS**

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



**WRITE FOR CATALOG II
Showing the Complete Catawissa
line of Perfect Seal Products
CATAWISSA VALVE &
FITTINGS COMPANY
950 MILL ST., CATAWISSA, PA.**

News for the South & Southwest (Continued)

Starts on Page 8

Clark Bros.—Southwest

William E. Dobbins has been named Central Regional Sales Manager by Clark Bros. Co., Olean, New York, one of the Dresser Industries.



In his new position, Mr. Dobbins will coordinate the activities of the Houston, Tulsa and Chicago offices and will make his headquarters in Houston.

For the past 25 years, he has managed the Clark Bros. and Dresser Industries office in Washington. He also has been a special representative for Clark in the New York City area.

Conoflow—Oklahoma

Conoflow Corporation has announced the appointment of Ernest L. Graves as a sales representative for Cono Controls. The Ernie Graves Company, with offices in Tulsa, will service the state of Oklahoma.

Mr. Graves possesses extensive experience in the fields of instrumentation and automatic control. Following his graduation from the University of Oklahoma, where he received his B.S. Degree in Mechanical Engineering in 1941, he served in the United States Navy as an engineering officer. In this capacity he attended the University of Notre Dame, Rensselaer Polytechnic Institute and the University of North Carolina.

On discharge from service, Mr. Graves worked for the Shell Pipe Line Corporation as a mechanical engineer, and later was employed by the Standard Oil Company of Indiana as a section head in the

Product Pipe Line Department. For the past seven years he has been engaged in the sales-engineering field; the last two years as sales manager for a manufacturers representative in Tulsa.

Ashby Represents Burndy In Ala., Tenn. and Fla. Areas

The Burndy Engineering Company, Inc., Norwalk, Connecticut, electrical connector manufacturers, announces the appointment of Charles W. Ashby as manufacturers representative, servicing sections of Alabama, Tennessee and Florida.

Mr. Ashby, with offices at 1827 28th Avenue South, Birmingham, will cover all of Alabama excepting Mobile and Baldwin counties, central and eastern Tennessee, and the northwestern tip of Florida.

Holder of the B.E.E. degree from the University of Virginia, Ashby has had considerable experience in the field — particularly in the southern area, having formerly been associated with C. B. Rogers & Associates, and the Line Material Company.

LaSalle Steel — Southeast

The Cameron & Barkley Company, distributor of industrial supplies in South Carolina, Georgia and Florida, have been appointed authorized distributors of "Stressproof" severely cold-worked-furnace-treated steel bars, a patented development of the La Salle Steel Company.

Distribution of the "Stressproof" line will be handled by all Cameron & Barkley's branches at Charleston, S. C., Savannah, Ga., and Jacksonville, Tampa, Orlando and Miami, Florida — with initial stocks carried in Jacksonville and Tampa warehouses.

"Stressproof" bars, which provide the tool room and automatic screw machine operations with a superior feed stock, have been designed to produce at lower costs many parts formerly made from carbon and alloy "single" or "double" purpose steels.



Building Water Treatment Systems is a man-size job!

Having been in the water conditioning business for nearly fifty years, we know that *every* water treatment job is a challenge. In this business, you can't send a boy to do a man's work.

Since 1908, Elgin has been designing, building and installing water conditioning equipment for thousands of purposes in hundreds of industries, institutions, municipalities and commercial establishments. Naturally, during that time, we've built up a backlog of experience and water engineering skill second to none. As a result, the name *Elgin* has become synony-

mous with superiority in the field of water conditioning — whether softening, dealkalinizing, demineralizing, deaeration, degasification, chemical treatment.

Elgin makes it a policy to meet *every* water treatment problem with concentrated attention. You can feel sure — when you bring your problem to us — that all the experience and knowledge at our command will be at your disposal. Talk over your water treatment problems with your Elgin representative. Or write us direct. We *can* help you!



ELGIN SOFTENER CORPORATION

132 No. Grove Avenue, Elgin, Illinois

Representatives in Principal Cities

In Canada: G. F. Sterne & Sons Ltd., Brantford



SOFTENERS



ION EXCHANGERS



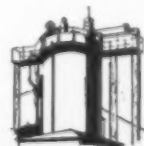
FILTERS



DEIONIZERS



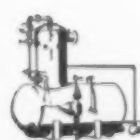
DEALKALIZERS



LIME COAGULATORS



DEGASITORS



DEAERATING HEATERS



**"THIS LUBRICANT
SAVED US
\$2,098.16
IN SEVEN MONTHS"**

—says THE BROWN COMPANY
Quality Paper Makers of Berlin, N. H.

"During a seven-month period before using LUBRIPLATE No. 130-AA in the bearing of our Kraft Mill Lime Kiln, we used a conventional oil at a cost of \$2,134.00. In the seven months that followed, we used LUBRIPLATE No. 130-AA for initial filling and replacement at the cost of \$35.84."

**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE LUBRICANTS
WILL IMPROVE ITS OPERATION
AND REDUCE MAINTENANCE**



For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.



News for the South & Southwest (Continued)

New Reynolds' Alabama Plant to Supply Ford

Reynolds Metals Company and the Ford Motor Company have signed a contract for the largest industrial aluminum order in the history of the aluminum industry.

Under the agreement, Reynolds will deliver to Ford during the next 10 years an amount of primary aluminum expected to be in excess of 640 million pounds. This total is larger than any previous industrial aluminum order in the United States. The contract is renewable at Ford's option.

It is planned to deliver most of the aluminum in molten form direct

from a new Reynolds reduction plant to a Ford foundry to be built adjacent to it. The new aluminum plant will be built at **Listerhill, Alabama**. Construction will begin in the near future.

The new producing unit will be Reynolds' seventh reduction plant and will add 200,000,000 pounds to the company's annual capacity of raw aluminum. This will bring its total capacity to more than 1,100,000,000 pounds per year. Since requirements of the Ford Motor Company will take less than a third of the additional output the balance will be available for other fabrication and will help ease the present short supply of raw aluminum.

"World's Largest Industrial Water Project"

Charleston, S. C. is obtaining a huge water supply at small cost. A lucky freak of geography plus bold action by the mayor of historic Charleston is responsible for a new engineering project that is going to give water-starved industries a huge reservoir of fresh soft water adjacent to plant sites directly on the ship channel.

Charleston is situated in the center of such mushrooming industries as pulp-and-paper, chemicals, petroleum and synthetic fibers. Fresh water in abundant supply is essential to continued industrial growth.

Several years ago, Charleston leaders recognized the fact that the Santee-Cooper hydroelectric plant 40 miles upstream was daily discharging 10 billion gallons of fresh soft water to no apparent avail. Once this vast amount of water was finished making power, it swept into Charleston harbor and out to sea.

Unfortunately, this 10 billion gallon daily flow was unfit for industrial use in plants along the ship channel because salty sea water running up the Cooper River on each incoming tide contaminated it. But an engineering scheme devised by Arthur M. Field, a Cornell-trained engineer, and pushed into reality by Charleston's mayor, William McG. Morrison, provided the answer to Charleston's industrial dream. It would mean a reshuffling of rivers, but the potential cost would be so

incredibly small and the outlook so great that the project began unfolding.

The 10 billion gallons of fresh soft water flowing daily from the Santee-Cooper hydroelectric plant would be diverted into Back River (a short stream parallel to the Santee-Cooper River) by means of a canal. Back River then would be closed by an earth-fill dam at its lower end to form a barrier to block salt intrusion into the fresh water reservoir.

Another geographic advantage is the fact that the Cooper River, which borders the industrial sites, offers a means of effluent disposal.

In 1953, the South Carolina general assembly created an eight-member Authority to administer the project.

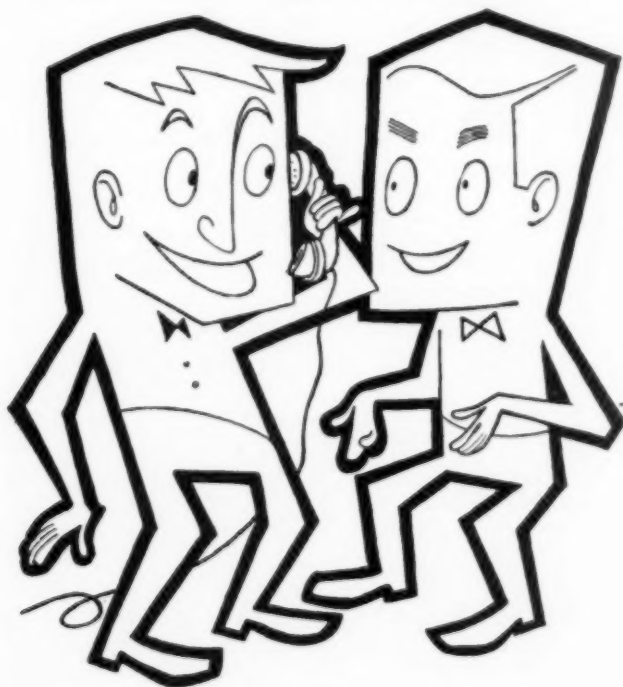
Composition of the marl being dredged from the river to form the dam is such that when it is exposed to air and water it acts like a natural mortar; the exposed surface case-hardens and becomes practically erosion-proof. This fact as well as geography contribute to the low cost estimate of \$4.5 million.

Now that the undertaking is scheduled for completion in July, 1956, efforts have turned toward getting industries which are particularly suited to Charleston's advantages. The Charleston Development Board says that big water-using industries have already expressed a keen interest.



How come you can get
all the coal you want?
Our deliveries
have been slow!

That's because we buy all our coal from
mines on the Chesapeake & Ohio. C & O has
more coal cars than any other railroad and
keeps close to 99% of them in good order.
This ready car supply means an uninterrupted
flow of coal to consumers.



How about the coal?
Is that as good
as the service?

C & O territory has always been known for
the superior quality coal it produces. And the
C & O fuel service engineer is always ready to
help us find exactly the right coal for our
particular needs.



There's a lot more to buying coal than
the cost per million BTU. Why not con-
tact coal producers on the C & O to
solve your particular fuel requirements,
or write to: R. C. Riedinger, General
Coal Traffic Manager, Chesapeake &
Ohio Railway Co., Terminal Tower,
Cleveland 1, Ohio, for the assistance of
a C & O fuel service engineer.

Chesapeake and Ohio Railway

WORLD'S LARGEST CARRIER

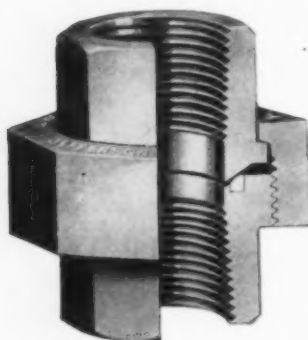


OF BITUMINOUS COAL

**Ask for these
features . . . and
you'll get them
in**

jefferson

A-4 PIPE UNIONS



If you're looking for a union that's easy to set up . . . that's absolutely dependable in toughest service . . . a union that's tight, economical and in many cases perfectly satisfactory for use under conditions normally calling for higher priced steel unions . . . then you'll find your specifications fully met through JEFFERSON design, construction and performance. For example:

. . . you are assured leak-proof tightness through accurately ground seats cut from specially drawn brass tubing . . . seats that are assured absolute stability through press-fitting into **machined** channels instead of being based in cast channels.

. . . you can depend on JEFFERSON'S true spherically ground ball joint for further assurance of satisfactory performance . . . once set up by light wrench pressure, a joint that will **stay** tight.

These features are made even more important by the better, stronger material (55,000 p.s.i. air furnace malleable iron) used in JEFFERSON UNIONS . . . by rigid inspection and testing . . . by ability to guarantee satisfactory performance under 500# p.s.i. steam and oil at 550° F. or 2,000# p.s.i. non-shock cold W.O.G. in sizes from 1/8" to 2".

The inherent high quality of JEFFERSON UNIONS is recognized by the approval of Underwriter's Laboratories. You can't get better performance under the same conditions at any price than you can get through the use of JEFFERSON UNIONS.

JEFFERSON also furnishes 90° and 45° Union Elbows, Union Tees and Flange Unions in 300# as well as Union fittings and unions in 250# and 150# types, with either brass to iron or iron to iron seats.

**JEFFERSON
UNION CO.**

**45 Fletcher Ave.,
Lexington 73, Mass.**

**The Unions that cost
less per year of service.**

News for the South & Southwest (Continued)

Link-Belt District Office in Louisiana

Link-Belt Company has opened a new district office in **Shreveport, La.**, at 3109 Alexander Street. The territory to be served by this new office will include Northern Louisiana, Southern Arkansas and 14 neighboring counties in Texas. **Gerald A. Stone**, who has been appointed district manager, formerly had responsibility for sales in much of this territory from the Link-Belt district office in Dallas.



He joined Link-Belt Company in 1945 and is a graduate of Texas A. and M., with a degree in mechanical engineering. Also assigned to the Shreveport office will be **Hunter McKay**, Link-Belt sales engineer.

Sylvania Expands Southeastern Operation

Sylvania Electric Products, Inc. has announced plans for a new 76,000 sq ft warehouse and sales office in **Atlanta, Ga.** Construction is already underway, and completion is scheduled for March, 1956.

A single story building, the new warehouse will include 8,000 sq ft of air-conditioned office space. Located on six and a half acres in the new Empire Industrial District, the building will have a storage capacity of approximately twice that of Sylvania's present Atlanta warehouse facility which is located on Murphy Avenue, S.W.

Sylvania products which will be distributed from the new location in seven southeastern states will include incandescent and fluorescent

lamps, wiring devices, lighting fixtures, photolamps, radio receiving tubes and television picture tubes.

David H. Lambeth will serve as district service manager on all Sylvania products in the new quarters.

Metal Goods in Memphis Stocking Parker Fittings

Metal Goods Corp., 1970 Latham Street, **Memphis 6, Tenn.**, is now a warehousing distributor for Parker Appliance tube fittings and tube-working tools.

The Memphis firm, which opened operations in a new warehouse in August, is under the managership of **Grover C. Meek**. Technical assistance will be given to the new distributor by **Lew C. Ely**, Parker district manager for the Southeast.

Allis-Chalmers — Southeast

Nat C. Hughs, Jr., and **Dale F. Romohr** have been newly assigned to the **Tampa** and **Charleston** offices, respectively, of Allis-Chalmers industries group.

Hughs, a 1953 industrial engineering graduate of Georgia Tech, recently completed Allis-Chalmers training course for graduate engineers.

Romohr has been associated with Allis-Chalmers Norwood Works since 1942, primarily in testing and inspection capacities. He is a graduate of the University of Cincinnati.

Copeland Refrigeration Southwestern Representative

Terrell J. Small of Fort Worth, Texas, has been appointed district sales representative of Copeland Refrigeration for **Texas** and **Oklahoma**. Mr. Small has been actively associated with air conditioning and refrigeration manufacturing, sales and distribution programs for eight years. He most recently was manager of the air conditioning department of the Lennox Furnace Company, Fort Worth, Texas.

Your plant needs an incinerator

to eliminate fire hazards—Spontaneous combustion, a carelessly discarded match or cigarette can touch off a ravaging fire in accumulated rubbish.

to eliminate lost space—Space costs money! it's too valuable to waste on waste which reduces productive area.

to eliminate hauling costs—Check your bills; see what a sizeable amount you're spending on waste hauling month after month after month.

Be sure it's a PLIBRICO Incinerator

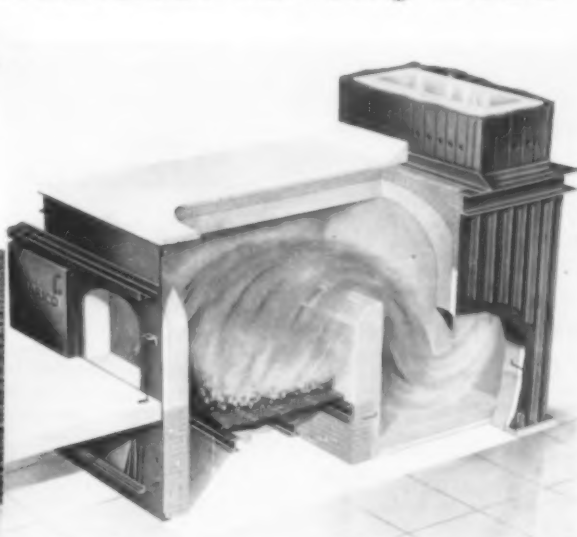
for efficient design—Adequate furnace and combustion chamber volume for rated capacities, proper gas travel and velocity changes for efficient burning.

for rugged steel casings—Built for longer service at lower cost, with steel casings that resist wear, require less care.

for enduring refractory linings—Joint-free monolithic linings free from weak spots of ordinary construction are anchored in place.

There's a Plibrico Incinerator for any need

FIELD-ERECTED MODELS — Field-tested designs cover units for garbage, dry waste, wood, pathological materials, or any combination. Capacities range to 8000 lbs./hr. and up. Unit shown is Standard Rubbish Destructor for mostly dry waste. Comprehensive catalog covers complete line.



PORTABLE MODELS — Factory assembled units with capacities from 135 to 450 lbs./hr. adaptable to average refuse, garbage, or pathological waste. Notice high 'n' wide doors on unit shown, ideal for charging bulky boxes, etc. All features described fully in our Portable catalog.

Plibrico Company

1838 Kingsbury St. • Chicago 14, Ill.

PLIBRICO SALES & SERVICE IN PRINCIPAL CITIES



What's your need for heat?

Whatever your heating job may be, you'll find the efficient, economical answer in . . .

CHROMALOX Electric Heaters

. . . for heating platens, dies, molds, metal parts . . . for heating liquids, air, gases . . . for curing, drying, baking . . . for comfort heating in offices and factories . . . for special applications . . . in fact for any application requiring fast, low-cost, controlled heat up to 1100°F.

IMMEDIATE DELIVERY

from the world's largest factory stock of industrial electric heaters . . . over 15,000 types, sizes and ratings.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically.

Write for your copy of Catalog 50

Contains helpful information on design uses, and prices of Chromalox Electric heaters, elements, thermostats, contactors and switches.

To get some interesting facts about additional applications of electric heat, ask for Booklet F1550—"101 Ways to Apply Electric Heat."



Edwin L. Wiegand Company

7563 Thomas Boulevard, Pittsburgh 8, Pennsylvania

EDWIN L. WIEGAND COMPANY

7563 Thomas Boulevard, Pittsburgh 8, Pa.

I would like to have—

- ☐ A copy of Catalog 50
- ☐ A copy of "101 Ways"
- ☐ A Sales-Engineer contact me

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

SALES ENGINEERING REPRESENTATIVES—Atlanta 9, Ga.—C. B. Rogers and Associates, 1000 Peachtree St., N.E.; Charlotte 2, N. C.—Ranson, Wallace & Co., 116½ East Fourth St.; Dallas 26, Texas—L. R. Ward Co., 3009-11 Canton St.; Houston 3, Texas—L. R. Ward Co., 1814 Texas Ave.; Nashville 4, Tenn.—H. B. Miles and Associates, 2500 Franklin Road.

News for the South & Southwest (Continued)

Personnel Manager for Island Creek Coal Company

Island Creek Coal Company, Holden, W. Va., has announced the appointment of **J. E. Osmanski** as Manager of Personnel. Osmanski was Director of Personnel at Crucible Steel Company of America in Pittsburgh, Pennsylvania, before coming to Island Creek. Prior to his employment with Crucible, he was an Associate Professor of Industrial Psychology at Penn State University. At Island Creek he will be responsible for executive and technical recruitment, management training and development, salary administration, and personnel policies.

Osmanski attended Haverford College and the University of Hawaii, from which he holds both his Bachelor's and Master's degrees. He has had specialized personnel and psychological training at Stanford University and the University of Chicago, and is currently a Doctorate candidate at the University of Pittsburgh.

Michigan Line—North Carolina

J. W. Burress, 100 Woughtown St., Winston-Salem, North Carolina, has been appointed distributor for the **Michigan** line of Tractor Shovels and Excavator Cranes, products of the Construction Machinery Division of **Clark Equipment Company**. Burress will handle Michigan products in the entire state of North Carolina.

Western Precipitation Opens Iron & Steel Industry Office

To meet the steadily-expanding demand for its electrostatic, mechanical and filter types of suspension-recovery equipment in the iron and steel industry, **Western Precipitation Corporation** has established an office at 1628 Oliver Bldg., Pittsburgh 22, Penna., under the direction of **Mr. R. G. Gaw** to handle the specialized needs of the iron and steel industry.

Appalachian Electric to Build 450,000 kw Clinch River Plant in Western Virginia

Plans for the construction of a major steam-electric generating plant in western Virginia by the **Appalachian Electric Power Company** were announced recently by Philip Sporn, president of Appalachian and its parent company, American Gas and Electric Company.

The plant will be known as the **Clinch River Plant**, will have an initial generating capacity of 450,000 kw, and will cost an estimated \$55-million.

It will be owned and operated by Appalachian; it also will be interconnected and integrated with the power systems of Kentucky Power Company and Kingsport (Tenn.) Utilities, Inc., and serve those AGE System subsidiaries as well.

The plant will be located on the south side of the Clinch River at the village of **Carbo in Russell County, Va.**, midway between the villages of Cleveland and Carterton and approximately eight miles west of Lebanon. The 105-acre site is adja-

cent to the Clinch Valley Division of the Norfolk & Western Railroad.

Coal from the extensive Clinch Valley fields will provide the fuel for the plant's two 225,000 kw generating units. Together they are expected to consume a total of 1,100,000 tons of coal per year, all of which will be supplied by the Clinchfield Coal Corporation under a long-term contract and will be delivered by short-haul. The land upon which the plant will be built was purchased from the coal company.

Excavation work is expected to start April 1 and both units are scheduled for completion in 1958, Unit 1 very early in that year and Unit 2 late in the year.

Mr. Sporn, in commenting on the new plant and its significance, pointed out that the continuing growth and development of the seven-state American Gas and Electric System by 1958 — and particularly the four Upper South states in which the plant will be centered: Virginia,

West Virginia, Kentucky and Tennessee — will require the additional electric power that Clinch Valley will provide.

"The new plant was located in western Virginia," Mr. Sporn said, "for three principal reasons. The Clinch River station will supply the territorial need for additional power, it will be situated in the middle of a rich field of economical coal, and it will be able to utilize existing transmission lines to feed the bulk of its power to major load centers to the north. At present, he explained, that area's electric power supply feeds southward from several large Appalachian plants to the north, principally the Glen Lyn steam plant and Claytor hydro plant in Virginia and the Logan, Cabin Creek and Kanawha River steam plants in West Virginia."

New Engineering Center for Fisher Governor Co.

Fisher Governor Company, Marshalltown, Iowa, has moved into its recently completed research and engineering center. The new three-story brick structure has 100,00 sq ft of space and is completely air-conditioned. It covers approximately half of a square block and about 200 of Fisher's 1,250 employees are assigned to the building.

The new facilities make possible better coordination and greatly expanded engineering and research activities. Performance tests can now be run on Fisher control equipment at pressures up to 2,250 psi, using air or water as flowing medium. A series of test lines up to 12" diameter are located in the acoustically treated laboratory.

Allcock Chf. Staff Eng. of Sterling Electric

Earl Mendenhall, President of Sterling Electric Motors, Inc., Los Angeles, has announced the appointment of Arthur J. Allcock, Jr., as Chief Staff Engineer. With the assignment of Allcock to this post, Sterling adds an executive engineering service to customers as well as its field staff of Application Engineers.

Allcock previously held the position of Chief Mechanical Engineer and has been instrumental in the development of many of the company's product improvements.

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News for the South & Southwest (Continued)

Vepco Personnel Changes

Three executive changes in the Virginia Electric and Power Company have been announced.

Forrest U. Ross, Richmond manager, has been appointed to the public relations staff of the company. He will be succeeded as Richmond manager by W. N. Cummins, Jr., now personnel director. Arthur L. Clark, now assistant treasurer, has been named as the new personnel director for Vepco.

Conoflow—Southwest

The E. K. Graham Company, Houston, Texas, has been appointed exclusive sales agency for Conoflow Corporation in the Houston - Gulf Coast territory.



Edward K. Graham, Jr., principal of the organization, formed the company in January of this year, as a manufacturers representative for the industrial process control field in the Gulf Coast area.

Mr. Graham, a mechanical engineering graduate of Drexel Institute of Technology, possesses broad experience in the process control field, especially as applied to the chemical and petrochemical industries. Before starting his own business, he was employed by Conoflow, where he came as a mechanical designer in 1943. Shortly after, he was appointed chief engineer. Later, Mr. Graham was made manager of the Technical Services Department. His new duties required him to travel extensively throughout the country, especially in the Southwest, supervising installations, educating plant personnel and making field adjustments on Cono-

flow equipment. He worked primarily with Conoflow Rotomotors and Cylinder Conomotors—pneumatic power operators widely used as final control elements for catalyst valves, gate valves, variable speed drives, proportioning pumps, etc.

The E. K. Graham Company has offices in 806 Scanlan Building, 405 Main Street, Houston 2, Texas.

New Infilco Division

The Ion-Exchange Division has been newly organized by Infilco Inc., manufacturer of equipment for all types of water and waste treatment.

The new division will be under the supervision of Howard W. Frazer, a graduate of Iowa State in Chemical Engineering, who joined Infilco in 1936. He has been a leading field engineer for the company since 1949, specializing in ion-exchange treatment. His experience includes close association with many of the largest ion-exchange treatment plants in states bordering the Great Lakes.

Infilco's Preston Pew Retires George Paulette Succeeds Him

After thirty-one years of service with Infilco Inc. Mr. Preston Pew has retired from full time activity with the company.

During his long association with Infilco, Mr. Pew has, at various times, been purchasing agent, factory manager, and most recently manager of the Municipal Sales division of the company. He is one of the senior members of the American Water Works Association and present president of the Arizona Sewage and Water Works Association.

Mr. Pew will continue as a consultant with the company upon a part time basis, so that Infilco can derive further benefits from his knowledge and experience.

Mr. George W. Paulette succeeds Mr. Pew as Manager of the Municipal Sales division. He has had 24 years experience with Infilco as a district and field engineer with headquarters in Kansas City, New Orleans, Cleveland and Orlando. Mr. Paulette has taken up his duties at the home office of the company at Tucson, Arizona.

"Atoms in Business"
May 10-11; San Antonio

Businessmen throughout the Southwest will have an opportunity to learn how their enterprises will be affected by developments in atomic energy. A two-day conference on "Atoms in Business" will be held in San Antonio May 10 and 11.

The meeting, the first of its kind in this area, is sponsored jointly by Southwest Research Institute and the Atomic Industrial Forum, Inc. and will be at the Plaza Hotel.

Nationally known speakers from the different fields of atomic development will address the group and the latest exhibit materials are being assembled.

J. Carlton Ward, president of the Vitrol Chemical Corp., will address the luncheon meeting the first day. Mr. Ward is founder of project NEPA for Nuclear Energy Propulsion for Airplanes of Airforces.

Walker Cislir, president of the Detroit Edison Co., will speak at the dinner May 11. His company is one of the leaders in application of nuclear energy to power generation.

Walter A. Hamilton of the Nuclear Development Corp. of America will speak to the group Friday afternoon. He was the executive secretary of the McKinney Committee which recently reported its findings in this field and urged that non-military aspects of atomic energy be made available to the public.

Information on reservations for the conference may be obtained by writing to C. W. Smith, General Chairman, Southwest Research Institute, San Antonio 6, Texas.

Navco Management Changes

Directors of National Valve and Manufacturing Co. recently elected Henry Haller, Jr., president of the firm to succeed his father, Henry E. Haller, Sr., who was named chairman of the board.

Frederick W. Richmond, New York industrialist and financier who previously served as chairman of the board, was named chairman of the executive committee.

George B. Anderson, Jr., who is in charge of Navco sales in New York, was elected a vice president.

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P-1 Incinerators

4-page bulletin 52B describes the Brule Portable Trash Burners for low cost incineration. The FG4 series consists of 200 lb/hr, 300, and 500 lb/hr capacity. These are masonry units which can be erected at job site. Unit can be easily moved.—BRULE INCINERATORS, 407 So. Dearborn Street, Chicago 5, Illinois.

P-2 Rotary Pumps

Bulletin 404 describes the company's line of liquid handling and high vacuum pumps, and other high vacuum equipment and systems. Pumping problems can be solved at lowest possible cost per year.—KINNEY MANUFACTURING DIVISION, division of The New York Air Brake Company, Boston 30, Massachusetts.

P-3 Plate Coils

Bulletin 256 describes Thermo - Panel Plate Coils which take the place of pipe coils for industrial heating and cooling processes. Two metal plates are embossed and then welded together to form flow channels. Can be made of a wide variety of metals. Bulletin gives design information for replacing pipe coils.—THERMO-PANEL DIVISION, Dean Products, Inc., 616 Franklin Ave., Brooklyn 38, N. Y.

P-4 Compact Steam Generator

Bulletin No. 586 describes the "Modulatic" steam generator, a self-contained, fully automatic unit makes possible addition of steam in crowded plants.—VAPOR HEATING CORPORATION, 80 East Jackson Blvd., Chicago 4, Illinois.

P-5 Sewage Handling

Bulletin 5100-B on the "Griductor" Comminutor describes how reduction of solids in sewage is accomplished by cutting and shearing rather than by pulping and smashing. Model sizes, installations, specifications and capacities with diagrams and charts are included.—INFILCO, INC., Tucson, Arizona.

P-6 Fire Protection

28-page catalog 73 "Engineered Special Hazard Fire Protection" covers methods of fire detection, methods of fire prevention, control and extinguishment and a

detailed chart showing major applications of fire control medium. — AUTOMATIC SPRINKLER CORP. OF AMERICA, Youngstown, Ohio.

P-7 Roof Ventilator

Data 304 describes a modern low design centrifugal fan unit primarily used to exhaust ventilation ducts serving relatively small spaces. The Airlift, in five throat sizes, is listed in a range of 29 capacity ratings.—THE SWARTWOUT COMPANY, 18511 Euclid Avenue, Cleveland 12, Ohio.

P-8 Maintenance and Supply

12-page booklet "Materials for Industry" describes Kaylo high temperature block in pipe insulations, Fiberglas industrial insulations, Fiberglas reinforced tapes and waterproof papers and Fiberglas built-up roofing.—OWENS-CORNING FIBERGLAS CORPORATION, Toledo 1, Ohio.

P-9 Gas Burners

Bulletin G-200-B describes the Mettler "Fan-Air" Gas Burner for forced, induced or natural draft operation in power plants. Burners are manufactured as completely packaged, fully automatic heating systems in capacities ranging from 400,000 to 25,000,000 BTU input.—THE METTLER CO., INC., 4366 Worth Street, Los Angeles 63, California.

P-10 Crane Electrification

Catalog 2021-A covers company Inverted-Y Electrification available for all makes of cranes and runways. Gives data on aluminum Inverted-Y conductors, supports and collectors for any normal application requiring current in amounts of 300 to 1000 amperes.—THE CLEVELAND CRANE & ENGINEERING CO., Wickliffe, Ohio.

P-11 Coal Dust Control

Bulletin 551-D discusses the use of local exhaust ventilation and cloth-tube-type dust collectors. Applicable to conveying and preparation of coal for burning; and the conveying, screening, crushing, weighing and batching of coal in chemical processing, etc. — WHEELABRATOR CORPORATION, 1135 South Byrkit St., Mishawaka, Indiana.

P-12 Clay Conduit Structures

Bulletin 56, 20 pages covers Heat Transmission Clay Conduit structures for insulated underground steam, hot water, process lines, chill water and refrigeration piping. — HEAT TRANSMISSION CONDUIT CO., 2300 Payne Avenue, Cleveland 14, Ohio.

P-13 "Canned" Motor Pump

4-page bulletin 1020 describes Series DE (Double Ended) Chempumps of the company's line of seal-less "canned" motor centrifugal pumps. Performance, diversion and operating principles are detailed.—CHEMPUMP CORPORATION, Station J, 1300 East Mermaid Lane, Philadelphia 18, Pa.

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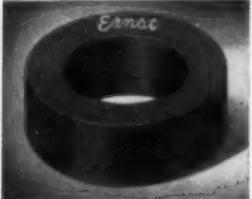


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P-14 Dust Collector

Bulletin 172-CFF describes compact packaged collector that can be installed readily in any collecting system by any shop crew. The company's "Aerodyne" is claimed to discharge air so dust free that it can be reused.—GREEN FUEL ECONOMIZER COMPANY, INC., Beacon, New York.

P-15 Water Pressure Reducing Valves

4-page bulletin 1009 covers two models of Spence direct-operated water pressure reducing valves, recommended especially for deadend water service where flow is intermittent and subject to abrupt fluctuation. Specifically recommended in industrial plants for washrooms and processing operations. — SPENCE ENGINEERING COMPANY, INC., Walden, New York.

P-16 Steam Generators

14-page bulletin 511 covers the Titusville Type WTP shop-assembled Water Tube Steam Generators, 2-drum boilers which are shop assembled and shipped as packaged units. Produced in steam capacities from 7,500 to 40,000 lb/hr. — THE TITUSVILLE IRON WORKS CO., Division of Struthers Wells Corporation, Titusville, Pennsylvania.

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P-17 Safety Clothing

12-page booklet covers asbestos suits, helmets, aprons, leggings, overshoes, gloves, etc., specially treated to increase resistance to heat, oil, water and abrasion. — Johns-Manville, 22 East 40th Street, New York 16, N. Y.

P-19 Vessel Lining

Data sheet 1012 describes Pre-Krete for lining vessels on the job. Illustrations cover preparation, lining procedure and application. — Pocono Fabricators, Inc., Division of The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

P-20 Plastic Pipe

30-page bulletin 24 covers polyvinyl chloride rigid plastic pipe outlining properties, applications, installation procedures, etc. — National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

P-21 "Packaged" Fans

28-page catalog 515 shows how Clarage V-belt Ready Units answer economically your smaller air handling requirements. 18 sizes—wheel diameters 9" to 32", capacities to 12,000 cfm. — Clarage Fan Company, Kalamazoo, Mich.

P-22 Steam Trap Book

44-page "The Handbook of Steam-Trapping" covers selection, installation, maintenance, capacities, etc. — Armstrong Machine Works, 806 Maple Street, Three Rivers, Mich.

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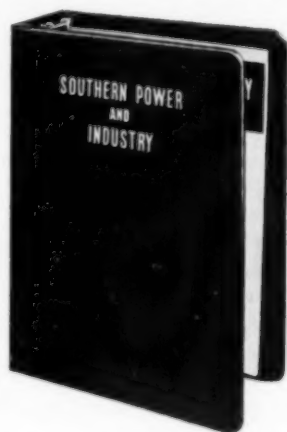
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P-18 Wire Rope Slings

Wall Chart, designed to be displayed in a prominent place in industrial plants, lists diameters and lifting capacities of ACCO-registered wire rope slings. — American Chain & Cable Co., Inc., 929 Connecticut Avenue, Bridgeport 2, Conn.

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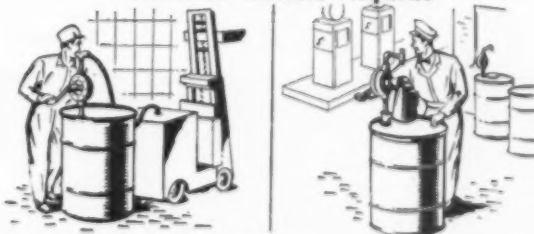
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Expansion Briefs

Reactor Component Plant of B&W—Lynchburg, Va.

The first permit to construct a critical experiment facility for the conduct of nuclear reactor core tests in private industry has been granted to **The Babcock & Wilcox Company** by the Atomic Energy Commission. The facility will be located on the same site as the fuel element fabrication plant which B&W is now building near **Lynchburg, Va.** Both installations are expected to be completed in April.

A critical experiment facility is used to test the nuclear characteristics of a full scale atomic reactor without generating appreciable quantities of heat, the announcement explained. Physicists and reactor designers use the information obtained from these experiments to confirm their theories and calculations and to establish the final distribution of fissionable, fertile and structural material.

The facility, 53 ft wide and 109 ft long, is designed for both critical experiments and proof testing of reactor components. It will house critical assemblies, control room, laboratories, storage vault, sub-assembly room, counting room, shops and offices.

\$10 Million Plastics Plant for Washington, W. Va.

Borg-Warner Corp. will erect a \$10 million chemical plant on a 322 acre site at **Washington, West Virginia**. Plant will produce a new-type thermoplastic resin called **Cyclocac**, which was developed and is being produced by the **Marbon Chemical Division of Borg-Warner**.

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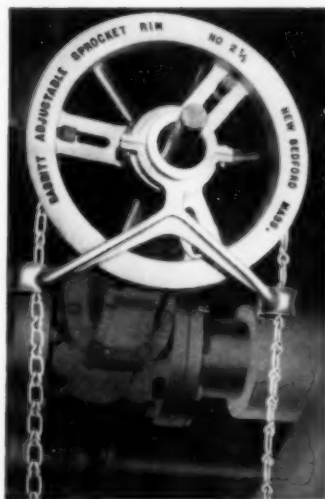
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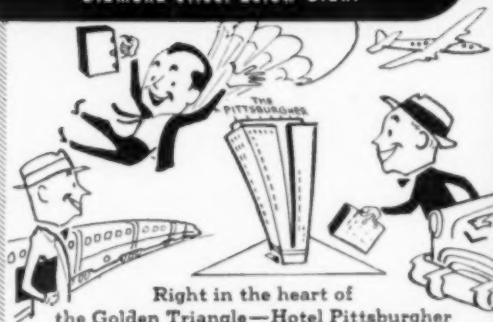
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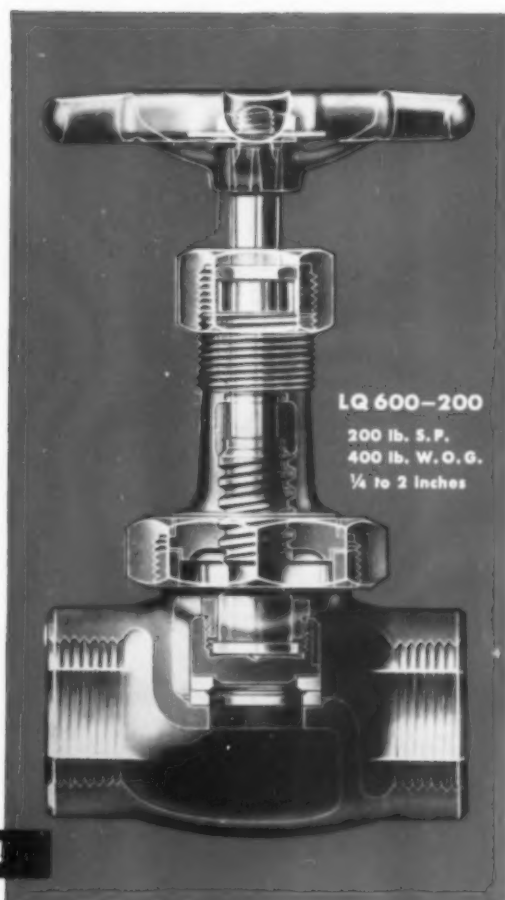
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